The Determinants and Consequences of FDI: Evidence from Chinese Manufacturing Firms

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Abstract

Using a very comprehensive Chinese firm-level data covering the period of 2000 to 2005, this thesis empirically assesses the determinants and consequences of Foreign Direct Investment (FDI) in China. In particular, the novelty of this research lies in our firm-level analysis which is based on a large sample of firms in 31 host provinces, allowing us to explore the question by distinguishing different modes of FDI inflows.

We employ binary-choice models to estimate how institutional quality and pre-acquisition firm heterogeneity affect the probabilities of domestic firms being acquired by foreign investors. We find better institution quality encourages FDI and this effect is stronger in capital-intensive and R&D intensive industries. Moreover, in capital-intensive industries, better institutions reduce the probability of domestic firms being wholly acquired. We also find evidence of 'cherry-picking' which is stronger in capital- and R&D- intensive industries.

We then apply a combination of propensity-score matching and difference-in-difference estimation to assess the effect of foreign acquisition on acquired firms with a focus on export performance, productivity and financial indicators. We find significant FDI-induced export lift and finance improvement. However, FDI-induced productivity change is not significant.

Finally, we investigate whether location determinants have different effects on attracting greenfield FDI as compared to acquisition FDI. We find the industry cluster pushes greenfield FDI away due to competition effect while attracting acquisition FDI, indicating that procurement opportunities have a strong impact on acquisition FDI.

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For any inadequacies or errors that may remain in this thesis, of course, the responsibility is entirely my own.

Contents

CHAPTER 1: Introduction

1 Motivation

The purpose of this thesis is to investigate the determinants and consequences of Foreign Direct Investment (FDI) in developing countries using firm-level data from China. The determinants of FDI are key factors in explaining the motives of FDI inflows, while the consequences of FDI illustrate whether the host economy benefits from FDI inflows. In an effort to provide a thorough understanding of inward FDI, we further consider different entry modes of inward FDI, in particular, we focus on two ownership modes of FDI, namely partially foreign-owned affiliates and wholly foreign owned affiliates, and also two investment modes of FDI, namely greenfield foreign investment and acquisition FDI.

Understanding the determinants and consequences of FDI in a developing economy is important for several reasons. First, the dramatic increase of FDI inflows into developing countries in recent years has attracted substantial interests from both academia and policy makers to study the main forces driving this new trend. In fact, the last two decades have witnessed an unprecedented surge in global FDI. According to United Nations Conference on Trade and Development (UNCTAD)'s database, FDI net inflows rose from 200 billion USD in 1999 to over 1.35 trillion USD in 2012. Its growth rate exceeds the growth of worldwide exports, domestic investment and gross domestic product (GDP). In recent years, a large share of FDI has flowed to developing economics and it continues to increase. In 2012, China, the largest developing economy, received

the lion's share of 121 billion USD (or 9 percent of the total) FDI inflows, followed by Brazil with 65 billion USD, Russia with 51 billion USD and India with 25 billion USD. Moreover, FDI has played an important role in emerging economies. For example, industrial output by foreign affiliates accounted for 31.5 percent of China's national industrial output in 2006.[1] Manufacturing FDI in India has also seen a five-fold increase over the period 2000 to 2009. In 2009, it accounted for 12 per cent of India's total exports.[2] Therefore, the intrinsic importance of investigating FDI in emerging countries comes from its rapid growth rate and its growing importance in the host economies.

Second, unlike developed economies, which have are well-developed market economies, most emerging economies are undergoing economic reforms across many aspects that may have an impact on the determinants and consequences of FDI in different ways. For instance, privatisation is recognised as an important factor in the surge of acquisition FDI in China (Huang, 2003) and Latin American countries (Calderón *et al.*, 2004). Also, with regard to the consequences aspect, Bernard and Jensen (2004) observe that FDI boosts affiliates' exports but that this effect varies across countries. These concerns are particularly relevant for less developed countries given their institutional environments.

Third, an investigation into inward FDI in a developing economy is interesting because of the controversy regarding the effects of FDI on developing countries. On one hand, it is a widely shared view that FDI contributes to the growth of under-developed economies by transferring technology, providing training for the local labour force, and facilitating access to the international

[1] Source: China Annual Survey of Industrial Enterprises.
[2] Source: *FDI in India and its Growth Linkages*, National Council of Applied Economic Research, India, 2010.

market (Borensztein *et al*., 1998; Nair-Reichert and Weinhold, 2001; Greenway *et al.,* 2004).

On the other hand, there are increasing doubts from developing countries about the benefits of FDI. It concerns the possibility that FDI may not help the dynamics of developing economies if it is only capitalising on raw materials and cheap labour (Caves, 1996; UNCTAD, 2002). Particularly, pollution-intensive and energy-intensive industries tend to be relocated into less developed countries which normally have lighter environment regulation (Javorcik, 2003). Furthermore, two crowding-out effects of FDI in developing countries have been drawing increasing attention since the mid-2000s. From a financial constraint perspective, Huang (2003) suggests that foreign investment crowds out pre-maturity domestic private investors who are subject to under-developed local financial markets. From a technology point of view, it suggests that the most competitive FDI affiliates crowd out domestic firms in terms of accessing scientifically and technologically talented workers. The enforcement of intellectual property rights and high level of ownership control also help foreign investors to crowd out independent research and development (R&D) centres of domestic investors who have less control (Backer, 2003).

Motivated by a substantial surge in FDI inflows into emerging countries and the controversy over effects of FDI in developing countries, in this thesis we investigate the determinants and consequences of FDI, with a focus on foreign affiliates in China. The main dataset used in this thesis is China Annual Survey of Industrial Enterprises (CASIE) collected by the National Bureau of Statistics of China (NBS) covering the period from 2000 to 2005. It provides comprehensive information about the characteristics of a large sample of firms across 31 regions

in China. Importantly, it allows us to identify two ownership modes (joint venture and wholly foreign owned) and two investment modes (greenfield investment and acquisition investment) of FDI inflows in China. One novelty of the current research is to provide firm-level analysis on the determinants of FDI with a focus on different modes of FDI inflows.

We believe that ownership modes and investment modes are important in explaining why particular modes of foreign invested firms are clustered in certain industries and regions. Many studies, as we show below, explain the existence of different modes in regions and industries relating to firm heterogeneity and location characteristics. Therefore, without thorough investigation on modes of foreign investment, assessing the determinants of FDI in a host economy is not all-inclusive.

Ownership modes indicate the level of control over local affiliates by foreign investors. In the literature, it can be explained by the transaction costs theory (Williamson, 1979; Crawford and Alchian, 1978) which predicts that a firm's ability to cover coordination costs subject to the host location's investment environment determines the ownership structure of FDI. Alternatively, it can also be explained by a contracting force on property rights (Feenstra and Hanson, 2005), which suggests a firm's profitability and protection enforcement in the host location are the key factors in explaining the level of control.

Greenfield and acquisition FDI are also commonly found as two investment modes in a host country. Existing theories also predict that firm-specific and host-location-specific characteristics determine the investment modes of FDI entry by setting up a new plant or acquiring an existing plant. Görg (2000) and Nocke and Yeaple (2008) show that firm characteristics (such as technology) and

a host country's investment environment (such as market size, institution quality) can explain why FDI operates in two different investment modes in host locations.

The second novelty of our research is that we use firm-level data to assess the effects of acquisition FDI on target firms, while most empirical works have documented the consequences of FDI by investigating the inter-firm spillover effects. Since foreign acquirers are usually multinational firms with advanced technology, efficient managerial skills and a large market share, one would usually expect foreign acquisition to have positive effects on the performances of the target firms (such as export increase and productivity upgrading). However, the literature so far shows mixed results. For example, Kneller and Pisu (2007) and Greenaway (2004) find positive export spillover effects. Conversely, Barrios *et al*. (2003) find no evidence of export spillovers. A number of reasons, such as absorptive ability, have been discussed to explain the mixed results. By taking advantage of the comprehensive firm level data, this thesis takes a different approach investigating the consequences of FDI based on a comparison of acquired firms' dynamics with similar domestic firms in the post-acquisition period using a propensity score matching technique.

2 The background of inward FDI in China and its policy context

Why is China of special interest for this research? This section describes the basic patterns of inward FDI, and evaluates FDI policy in China during the period under examination of this thesis.

2 .1 Basic patterns of FDI in China

The first wave of FDI inflows into China was the result of a policy of experimentation with joint ventures in the 1980s. By 1991, inward FDI in China reached 4.4 billion USD from almost zero before the adoption of openness and economic reform. The majority of FDI was relocated from Hong Kong's manufacturing sector to Southern China in the form of joint ventures. [3] The second stimulus of inward FDI was the formal announcement of the approach toward a market economic system in 1992. During the1990s, inward FDI increased ten-fold to more than 45 billion USD in 1998. The recent wave of FDI inflows into China was followed by China's accession to the World Trade Organisation (WTO) in 2001. During the 2000s, China received a higher amount of inward FDI than any other large developing FDI recipient did, as we can see in the comparison in Table 1-1.

Table 1-1: Inward FDI in major Emerging Countries, 2000 to 2009 (USD billion)

Country	2000	2001	2002	2003	2004	2005
China	41	47	53	54	61	72
Russia	3	3	4	8	15	13
Brazil	33	23	17	10	18	15
India	4	6	6	4	6	8

Source: UNCTAD's FDI database.

During our sample period, manufacturing FDI dominated FDI inflows. In 2001, 56 percent of the total amount of FDI in value terms flowed into the Chinese manufacturing sectors. In addition, 70 percent of FDI projects were

[3] Source: The Ministry of Commerce of the People's Republic of China and the UNCTAD FDI database.

investing in manufacturing plants.[4] Although we have observed an increase in the share of tertiary sector FDI, due to the opening up policy in the tertiary sector in recent years, manufacturing FDI remains the top performing of the sectors, accounting for 57 percent of total value in 2011.

Manufacturing FDI varies in Chinese manufacturing industries. It can be seen that a majority of manufacturing FDI inflows in China is driven by its lower costs of production, which is consistent with comparative advantage norms. Indeed, the distribution of FDI across manufacturing sectors shows a bias in favour of labour intensive industries. Large clusters can be found in textiles and wearing apparel industries.[5] Although the electrical machinery and communication equipments sectors also attract a considerable amount of FDI, it is argued that many of them are original equipment manufacturers (OEMs) which do not heavily feature R&D. For example, Foxconn, one of the largest multinational electronics OEMs in the world and which has recruited more than one million employees in China, produces parts for the iPhone, which was developed outside China.

Manufacturing FDI in China also shows an uneven distribution across the regions. The biased regional distribution of FDI in China is associated with the uneven economic development of the regions. The eastern coastal regions, which have large ports, more regulatory provision and strong industrial development attract more foreign affiliates, especially Guangdong and Shanghai. Fewer foreign invested firms are found in under-developed central regions and western mountainous regions.

Foreign invested manufacturing firms have also seen a change in modes of

[4] Source: The Ministry of Commerce of the People's Republic of China and the UNCTAD FDI database.
[5] For more details please refer to Table 2-3 in Chapter 2.

entries. Before the 2000s, FDI in China occurred mainly in the form of joint ventures (partially foreign owned) and greenfield firms. In 2001, contributing to joint venture experiments, the accumulated joint ventures accounted for 65 percent of total FDI in China in dollars. Moreover, because there was no regulatory provision for the acquisition of state-owned enterprises and the undeveloped private sector in the early years, greenfield FDI dominated FDI inflows until the late 1990s. Because of China's WTO commitments to a phased opening up, China removed many restrictions on foreign investors. Since then, solely foreign-owned enterprises have become more popular than joint ventures as a form of FDI in China. Furthermore, complemented by the privatisation of state-owned enterprises and a booming private sector, acquisition FDI dominated greenfield foreign investments and continued to grow strongly.

Another important feature of FDI in China is that a majority of manufacturing FDI inflows are recognised as export-orientated. This is initially because of the small domestic market size of China in the early years of FDI boom. In addition, China's export promotion policies, such as processing trade tax exemption policies, played an important role in attracting export-orientated FDI. However, amid a slowing down of world demand and rising production costs in China, recent debate has focused on integrating FDI into domestic markets.

2.2 The recent FDI policy context in China

In recent years, there has been a switch of FDI policy in several aspects in China, which is common in many other large emerging countries as well. First, since the mid-2000s, the Chinese government appears to have taken a more

selective stance on its FDI policy by increasingly emphasising the quality rather than the quantity of inward FDI. High-tech foreign investments are invited to fill gaps in the Chinese economy. At the same time, China increasingly restricted FDI with high environmental-pollution and energy-consumption. This shift can be traced in the *Catalogue of Industries for Guiding Foreign Investment* which shows industries that are 'encouraged' and 'permitted', or 'restricted' and 'prohibited' to foreign investors. In the 2011 *Catalogue*, for example, new energy, new materials, high-end equipment, and energy-saving equipment were added to the 'encouraged' category. Indeed, the rapid economic growth of the last three decades has been at the cost of natural resources and environment pollution.[6] The Chinese government has realised such an economic growth model cannot last long.

Second, by recognising a great regional disparity, efforts have been made to boost FDI in less-developed central and western regions of China. China has issued the *Catalogue of Priority Industries for Foreign Investment in Central and Western Regions*. In addition to having all the benefits that the *Catalogue of Industries for Guiding Foreign Investment* offers, 'encouraged' industries are eligible for further favourable tax policies and land use policies.[7] Meanwhile, because the developed coastal regions are seen as a rising investment (land) and production (labour) costs, low-cost interior regions such as the former industrial base, North-East China, is undertaking major infrastructure developments. The competitiveness of these regions in attracting FDI is increasing.

Third, while keeping a light restriction on foreign investment, the Chinese

[6] *Catalogue of Industries for Guiding Foreign Investment*, published by the Ministry of Commerce, People's Republic of China, 2011.
[7] *Catalogue of Priority Industries for Foreign Investment in Central and Western Region*s, published by the Ministry of Commerce, People's Republic of China, 2011.

government has gradually removed its FDI preferential policies. As a part of this move, the government abolished fiscal incentives for foreign investment. In fact, after 30 years of fast economic growth, lack of capital is no longer a problem for the development of the Chinese economy. In addition, more domestic firms have developed to the stage where they are able to compete with foreign firms. Voices demanding a fair competitive market are increasing in number.

To summarise, behind the FDI phenomenon in China is a skewed distribution in industries and regions, with changes in FDI composition in terms of modes of entry. These characteristics are evolving as China is also undergoing a switch in its FDI policy. Many of these attributes are commonly found in a number of other emerging countries. Therefore, this thesis is motivated by understanding the determinants and consequences of inward FDI in China as a reference for other developing countries.

3 Organisation of this thesis

This section sketches the outline for the whole thesis and summarises the specific motivations and key findings of each core chapter. This thesis is organised as follows: in Chapter 2, we first investigate the determinants of acquisition FDI, with a special focus on the role of local institutional quality and pre-acquisition firm heterogeneity. Chapter 3 examines the effects of foreign acquisition on exports, productivity and the financial status of foreign-acquired firms. In Chapter 4, we study whether location determinants of FDI have different effects on attracting greenfield FDI versus foreign acquisition. We conclude in Chapter 5.

3.1 Determinants of foreign acquisition: the role of institution and firm heterogeneity

This chapter provides an understanding of why acquisition FDI inflows have a skewed regional and industrial distribution by examining the determinants of foreign acquisition with a variation of different ownership modes. Since the 1990s, institution quality has been focused upon as a key factor explaining FDI flows across countries. It is widely accepted that countries with less corruption, greater political instability and fairer property right enforcement, attract more FDI inflows (Bénassy-Quéré, 2005, Asiedu, 2006). Based on the industrial organisation (IO) literature, multinational studies also recognise that institution quality is a determinant factor in the ownership modes of FDI. Transaction cost theory suggests that institutions that are more efficient encourage joint ventures, which is costly due to coordination (Williamson, 1979; Asiedu and Esfahani, 2001). Property rights theory points out that wholly foreign-owned affiliates are preferred when there is an improvement in contracting forces since foreign investors are not willing to share the control of power and profits (Feenstra and Hanson, 2005; Javorcik and Wei, 2009).

With the availability of firm-level data in recent years, firm-level characteristics prior to foreign investment are also found to determine FDI inflows. Girma *et al*. (2005) suggest that the more productive firms in the United Kingdom are more likely to be foreign acquired. Firm-level characteristics also have effects on the ownership mode of FDI. Many studies such as Raff *et al*. (2009) and Hebours and Ruf (2010) have found that efficiency is positively related to the level of control.

Something in common across the literature is that most studies focus on

multinationals. Moreover, fewer studies have integrated this broader literature with an investigation into how institutional quality and firm heterogeneity affect the ownership structure of acquired firms. This chapter contributes to the literature by filling these gaps with a use of comprehensive Chinese firm-level data in the period 2000 to 2005. We employ binary choice logit models to estimate the probabilities of domestic firms being acquired by foreign multinationals. Furthermore, we explicitly distinguish different ownership modes of foreign acquisition in our discussion.

Interesting results emerge. First, we find that the better institutions encourage foreign acquisitions in China. This effect is found to be strongest in capital- and R&D-intensive industries. second, we find better institutions discourage wholly foreign owned affiliates in more capital-intensive industries, which is consistent with transaction cost theory. Third, we confirm that foreign investors 'cherry-pick' domestic firms. Firms that are more productive are more likely to be acquired by foreign investors. Fourth, conditional on foreign acquisition norms, domestic firms that are smaller, younger, more capital- and export-intensive are more likely to be wholly foreign acquired.

3.2 The consequences of acquisition FDI

Having understood the key determinants of acquisition FDI at regional, industry and firm level, in Chapter 3, we examine the consequences of acquisition FDI on the acquired firm's export performance, productivity and financial status. As described earlier, one attribute of FDI in China is that the majority are export-orientated. In Chapter 2, we also find more export-intensive firms are more likely to be acquired. Other studies such as Zhang and Song

(2001) suggest a positive link between FDI and regional manufacturing export performance. However, does FDI lift an acquired firm's export performance after acquisition? Probably because of data limitations, little effort has been focused on FDI effects on export performance at an intra-firm level. We also contribute to the literature by investigating other FDI-induced consequences such as changes in productivity and financial constraint of the acquired firm.

In order to control causality issues and unobserved time-invariant effects, we implement the combination of propensity matching and difference-in-difference (DiD) technique with using China's firm-level data. Our difference-in-difference estimators suggest that foreign acquisition significantly increases the export intensity of the acquired existing exporter. In addition, foreign investment increases the likelihood of export of acquired firms if they were non-exporters prior to the acquisition. Second, the increase in export performance is not due to FDI-induced productivity change since we do not observe any significant intra-firm productivity gain. Third, our results show a significant FDI-induced reduction in long-term debt. Fourth, we justify whether the increase in exports due to foreign acquisition is related to the reduction in debt. The effect of a reduction in debt on export increase is found to be quantitatively negligible.

3.3 The location of manufacturing FDI in China: greenfield versus acquisition

Although acquisition FDI has dominated FDI inflows into China since the late 1990s, we also observe a fair amount of increase in greenfield foreign investment. In this chapter, we extend our study with an understanding of the

regional and industrial disparity of foreign investment by splitting our sample into greenfield foreign investment and acquisition FDI.

There is a limited economic literature explaining the existence of the two investment modes. Some studies from the multinationals' perspective suggest that more technologically advanced firms tend to set up a new plant in a host country rather than take over an existing one due to high adoption costs (Görg, 2000; Nocke and Yeaple, 2008). Evidence of the relationship between the two modes of investment and the location characteristics is even scarcer. According to some intrinsic differences between greenfield and acquisition investment, Neto *et al.* (2010) show risk measurements play an important role in the location decision of the two investment modes because greenfield investment is a more risky strategy compared to acquisition. Based on new economic geography theory, Roberto (2004) shows that a high concentration of local firms generates agglomeration externalities, which have a positive effect on attracting acquisition FDI, while this effect is not significant on greenfield foreign investments.

This chapter provides an investigation into the agglomeration determinants and other location determinants of the two investment modes of FDI in China. In general, we first find that market potential has a positive effect on both modes of investments but this effect is marginally stronger in greenfield FDI projects. It is because acquisition FDI takes over the markets of the acquired firm, which is absent in the case of greenfield investment. Second, we find greenfield foreign investment is negatively related to the number of firms of an industry in the same region because of competition effects. However, acquisition FDI is encouraged with a higher number of local firms, implying a rapid growth of acquisition FDI in recent years can be explained by a strong procurement effect. Third, we also

find that higher stock of FDI of an industry in a region attracts more FDI in general, and this effect is larger for the greenfield FDI. This is because foreign investors have limited knowledge about the host location investing environment. The FDI stock is a signal to suggest whether the investing environment is foreign-friendly. Greenfield foreign investment is a riskier strategy and more dependent on this signal than acquisition FDI.

Our research in this chapter is the first of its kind with its focus on location characteristics that affect the two FDI investment modes in China. It is an important step toward future studies as to how greenfield FDI has different consequences in developing economies compared to acquisition FDI.

CHAPTER 2: The Role of Institution and Firm Heterogeneity in Foreign Acquisition: Evidence from China

1 Introduction

The role of institution and firm heterogeneity in foreign acquisition has received increasing attention in the international economics literature in recent years. Two common views have been voiced. First, it is widely documented that countries with 'better quality' institutions are more popular as destinations for foreign acquisition. Secondly, the productivity of the target firm, along with a range of other firm performance variables, has been shown to have an impact on the probability of acquisition.

Less studied within this broader literature have been the questions of how the same variables, institutional quality and firm heterogeneity affect the ownership structure of acquired firms. Are the types of firms acquired as wholly owned enterprises similar to those that are acquired as joint ventures, or different from them? How does regional institutional quality affect these choices? China serves as an appropriate setting for providing empirical evidence to the above two questions as China has been one of the largest recipients of Foreign Direct Investment (FDI) and the distribution of FDI between joint ventures and wholly owned enterprises there differs markedly across regions, industries and time. [1] In this chapter, we contribute to this literature by adding empirical evidence using a Chinese firm-level data set together with a new measure of regional institutional quality to investigate the determinants of acquisition activity.

A remarkable fact is that the flow of FDI to China has surged recently,

[1] Source: Please refer to the UNCTAD survey, 2010.

increasing from $3.49 billion in 1990 to $69.47 billion in 2006 in realised value. In 2006, industrial output by firms with foreign investment became a major part of China's national industrial output, accounting for 31.5%, compared to 2.28% in 1990.[2] Foreign acquisition played an important role in the surge of China's FDI inflows during this period, as we observe that over 80 per cent of FDI inflows during 2000-2005 were through acquisitions, while greenfield firms with foreign investment accounted for less than 20 per cent only. However, these investments are geographically concentrated in a few regions; six Chinese provinces accounted for about 82% of the foreign acquisitions that took place during the period 2000-2005.[3] Furthermore, we find that the acquisitions are clustered in a few industries; for example, 41% of the acquisitions during the period 2000-2005 have taken place in six industries.[4] Motivated by these stylised facts, one objective in this paper is to investigate whether variations of institutional quality across Chinese provinces help explain why foreign acquisitions are more likely to take place in some particular regions, and why acquisitions are more prevalent in some industries. With use of the firm-level dataset, we are also interested in whether acquired firms are different from other domestic firms before the acquisitions take place.

On the other hand, apart from choosing the location of foreign acquisition and takeover activities, multinational firms also often need to decide the ownership mode of acquisition, that is, whether to establish a wholly owned affiliate (wholly owned enterprise) or to set up a partially owned affiliate (joint venture). We observe that the number of cases of these two modes were almost

[2] Source: Ministry of Commerce of the People's Republic of China.
[3] The six provinces are Guangdong, Shanghai, Jiangsu, Zhejiang, Fujian and Shandong.
[4] The six industries are wearing apparel, chemicals, plastic products, general purpose machinery, and electrical machinery and communication equipment.

equal during the period 2000-2005.[5] However, the distribution of the ownership modes of acquisition FDI varied across regions and industries. For example, we find that more firms were acquired as joint ventures than wholly owned enterprises in most of the regions except Shanghai, Fujian and Guangdong. Furthermore, in plastic and communication industries, wholly owned foreign affiliates were more prevalent, making up 60% of acquisition cases. These observations motivate the second objective of this paper, which is to probe deeper into the question of how the regional institutional and firm characteristics affect the ownership mode of acquisition. To be more precise, whether institutional impact on the mode of acquisition within a region in China varies across industries, and whether wholly acquired firms are different from joint ventures in pre-acquisition characteristics.

Our ability to answer the above questions would be greatly enhanced by investigating a very comprehensive, firm-level, production and accounting dataset covering medium- and large- size enterprises in China's manufacturing sector, compiled by the National Bureau of Statistics of China. Its Annual Survey of Industrial Production (ASIP) dataset includes more than 456,000 individual Chinese firms during the period of 2000-2005, and provides detailed information on aspects like the firms' total employment, value-added, age, capital stock, and, most importantly, the equity shares held by domestic and foreign owners. This allows us to identify changes in the firms' ownership modes, including foreign-owned versus domestically-owned or wholly foreign-owned versus joint ventures. To examine the role of institutions, we combine the ASIP data with the Annual Report on Urban Competitiveness in China, which includes the index of

[5] There were 6,298 newly acquired wholly-owned enterprises and 5,906 newly acquired joint ventures during the period 1999 to 2005 in our sample.

property rights protection across 31 mainland provinces/municipalities in China during the period from 1997 to 2007. We use this as a proxy for the quality of institutions. Following the existing literature, we adopt the binary logit model to identify the key determinants of acquisition FDI in China, with a special focus on the role of local institutional quality and the firms' pre-acquisition characteristics.

A number of interesting patterns emerge. First, we find that better local institutional quality generally has a positive effect on foreign acquisition activities, which also crucially depends on the characteristics of the industries. More specifically, we find that the positive effect of the institutions is stronger in more capital-intensive or more R&D-intensive industries, indicating that these industries are more dependent on the quality of local institutions to attract acquisition FDI. One possible interpretation is that the protection of property rights plays a more important role in capital- or R&D-intensive industries, and further enhances the positive impact of good institutions on the multinational firms' incentives to acquire them. Furthermore, in terms of the ownership mode of foreign acquisition, we find that, conditional on foreign acquisition norms, better institutions increase the probability of being partially foreign-owned, relative to wholly foreign-owned, only in highly capital-intensive industries. To the best of our knowledge, this finding is new, and has not been reported in previous studies, especially in the context of developing countries.

In the existing literature, at the macro level, as argued by Asiedu and Esfahani (2001), country-level institutional quality has been identified as one explanation for the popularity of some countries as FDI destinations, and the inability of some other countries to attract FDI. However, perhaps due to the limitations of data availability, micro-level evidence using firm-level data

focusing on foreign acquisitions has been very scarce. Our study fills this void by taking advantage of the richness of the Chinese firm level data, and the large variation of institutional quality within China, both across provinces and over time. On the other hand, there exist only a very limited number of studies on the impact of country-level institutional quality on the mode of entry of the multinationals. In particular, Asiedu and Esfahani (2001) find that the country's institutional set-up affects the ownership structure of FDI. More recently, Kamal and Lovely (2010) have found robust evidence showing that China's WTO accession has influenced the multinational firms' ownership choices using Chinese enterprises data. However, they do not examine how local institutional quality and industry characteristics have affected the mode of foreign acquisitions. Hence, one important contribution of this study to the existing literature is to reveal how local institutional quality may affect the incidence of acquisition FDI and the mode of foreign acquisition at the firm level in China, which has not yet been fully investigated in the existing literature.

Secondly, in terms of the firms' pre-acquisition characteristics, we find that the acquired firms, in general, have had better performance indicators, such as productivity, firm size etc., compared to non-acquired firms, before acquisition takes place. Furthermore, in terms of the ownership mode of acquisitions, we find that the more productive and larger firms are less likely to be wholly foreign-acquired than partially acquired.

In the existing literature, the efficiency of the firm has been acknowledged as an important factor that affects the incidence of acquisition and its ownership mode. It has been documented that the acquired firms are more productive than non-acquired firms are. MoGukin and Nguyen (1995) show that the

multinational firms 'cherry-pick' their targets, and accordingly choose the firms with the highest productivity. Girma (2005) and Girma *et al*. (2005) have also documented that firms in the U.K. are more likely to be acquired by foreign multinationals if they are more productive. It has yet a firm-level analysis that tests 'cherry-pick' hypothesis in China, our study contributes to the literature by first confirming the 'cherry-picking' story for China as found in other countries in the sense that multinational firms target the best performing domestic firms for the purpose of acquisition.

In addition, there are also few empirical studies showing that multinationals that are more efficient prefer wholly owned affiliates to joint ventures, such as those of Hebours and Ruf (2010), Raff *et al*. (2009) and Mugele and Schnitzer (2008). However, these studies focus on the effect of productivity of the multinational firms, rather than those of targeted domestic firms being acquired. Therefore, different from their approach, we reveal the relationship between acquired firms' pre-acquisition productivity and their post-acquisition share of foreign ownership, which may be non-linear: whilst firms that are more productive are more likely to be acquired by multinationals, the most productive acquired firms are more likely to turn into joint ventures rather than 100 percent foreign-owned. Compared with the existing literature, our paper is perhaps the first study to examine various acquired firm's characteristics in determining the likelihood and the ownership mode of foreign acquisition.

The rest of the chapter is organised as follows. Section 2 reviews the literature by providing a brief survey of recent studies on the prevalence of acquisition FDI and the mode of entry of multinational firms. In Section 3, we introduce our empirical methodology and our main specifications. In Section 4,

we describe our data, explain the construction of key variables, and provide a descriptive analysis on the data. We present our main results in Section 5 and conclude it in Section 6.

2. Literature review

2.1 Determinants of foreign acquisition

Institutional climate has been identified as an important determinant in foreign acquisition. Blonigen (2005) suggests that it is especially important for developing countries. First, without good property right protection, high expropriation risk discourages foreign investment. Second, poor institution quality results in a less-functional market. Consequently, higher operational costs prevents FDI inflows. Last but not the least, poor institution quality provides inadequate public services and thus poor infrastructure which diminish inward FDI.

Empirically, a large body of cross-country studies suggests that the inability of some countries to attract FDI is largely explained by poor institutions. Wei (2000) is one of most influential early studies on institution effects on FDI. Based on bilateral FDI from 12 source countries to 45 host countries, the paper shows that a variety of measures of corruption indices impede inward FDI. With the use of six governance indicators provided by Kaufman *et al*. (1999), Globeman and Shapiro (2002), it found quality institutions measured by better public governance infrastructure, free from corruption, and strict legal system enforcement encourage both a country's FDI inflows and outflows.

More recently, Bénassy-Quéré *et al*. (2007) uses the institutional profile

database which provides an estimate of institutional quality across 52 countries to examine institutional determinants of FDI using a gravity model. They point out that institutional environment, in a broad sense, is a major determinant of FDI inflows. Their institution measures include the tax system, ease of creating a company, lack of corruption, transparency, contract laws, security of property rights, efficiency of justice, and prudential standards. They conclude that 'good' institutions almost always increase the amount of FDI received. Daniele and Marani (2006) analyse the quality of institutions as a factor to attract FDI in the Middle East and North African (MENA) countries using the Kaufmann *et al*. (2005) governance indicators. They show that poor institutions are a relative weakness of MENA in attracting FDI. A relative study conducted by Asiedu (2006) also investigates how institutional and political instability affects FDI in Sub-Saharan Africa, using a linear regression model. The institutional variables are measured by the indicators of corruption and effectiveness of the Rule of Law from World Bank surveys. It finds that corruption impedes FDI inflows, while effectiveness of the rule of law encourages it, focusing on property right protection.

Most of these studies are cross-country investigations. Two criticisms have been raised by Blonigen (2005). First, Blonigen (2005) suggests that institutions are quite persistent and not likely to vary over time in many countries, specially developed countries. Second, it points out that most institution measurements in the existing studies are sourced from survey responses in different countries. Therefore, the comparability of institution indexes cross countries is questionable when survey responses are in different backgrounds. One reference is from a comment that Kaufmann *et al*. (1999) made on its aggregate governance

indicators. It suggests that aggregate governance indicators are informative but the standard errors associated with its estimation are relatively large.

Investigating institutional impact in China can overcome the first criticism as there has been a significant improvement in institution quality since its reforms. There are also a number of studies that have identified that the overall improvement of institution in China over time has played an important role in attracting FDI, such as Fan *et al*. (2009). This paper regresses country-level FDI inflows on a number of institution quality measurements. The discussion on the case of China is based on China-specific dummies. The 'impulse response' of China's 1993 reforms shows that China's FDI inflows are stimulated by better governance. Its cross-country level institution measurement is adopted from the rule of law index from ICRG and International Country Risk Guide. The measurement errors associated with different backgrounds of survey responses is still not solved in this paper's empirical strategy.

However, investigation on provincial-level institutional impact on FDI inflows in China addresses both criticisms. Apart from distinctive institution improvement in all provinces in China, the institution quality of each province varies largely. Furthermore, a survey based institution index is more reliable as the survey responders have the same country background. In the literature, little has been done to focus on intra-country institutional impact on the allocation of FDI, especially acquisition FDI, in China. Du *et al*. (2008) examine 6288 U.S. affiliates in different Chinese provinces over the period 1993 to 2001. It shows that U.S. affiliates prefer to locate in those provinces that have better intellectual property right enforcement, higher contract enforcement and lower levels of government corruption. In this paper, we complement the literature by examining

whether regional institutions have an impact on attracting acquisition FDI by using a dataset which records provincial institutional data over the period of 2000 to 2004. Compared to the country-time level institutional indicators, this indicator offers an additional dimension of variation to isolate region-time specific factors that potentially correlate institutions with foreign acquisition, such as the regional labour quality, utility prices, etc.

In addition to institutions, several other region-specific characteristics influencing foreign acquisition have been documented in several studies which examine the allocation of FDI. From a Chinese perspective, Cheng and Kwan (2000) estimate the effects of determinants of FDI in 29 Chinese regions from 1985 to 1995. Using GMM estimation on the regional stock of the FDI, they conclude that a large regional market, good infrastructure and preferential policy have a positive effect on FDI, while wage costs have a negative effect. The policy variables in their paper include the number of Special Economic Zones, Open Coastal Cities, Economic and Technological Development Zones and Open Coastal Areas, rather than direct institutional measures. A more recent study by Amiti and Javorcik (2008) examines the determinants of foreign entries in 515 Chinese industries at the provincial level, during 1998-2001, using non-linear least squares. They find that production costs measured by provincial wage and electricity prices, the availability of infrastructure and the openness measured by the agglomeration of foreign firms, play important roles in the number of foreign entries. According to these studies, we also include regional GDP per capita, average wages and foreign presence into our analysis.

Recent literature has also frequently stressed firm characteristics as an important factor determining FDI. Girma *et al*. (2005) use the OneSource data set,

spanning the decade between 1988 and 1998, to investigate the impact of the firms' exporting intensity on foreign acquisitions in the U.K. manufacturing industries with a consideration of a range of other firm characteristics. By using quasi-likelihood estimation, they found that the U.K. firms with a higher exporting intensity are more likely to be foreign takeover targets. They conclude that the evidence is consistent with the idea that the U.S. acquisition FDI in the U.K. is to establish a platform for serving the wider E.U. market. Furthermore, they find that productivity and firm size have positive impacts on the probability of being acquired by foreign firms. These results accord with the argument which is made in early industrial organisational literature. It asserts that the acquiring firm should 'cherry-pick' its targets and accordingly choose the firms with the highest productivity. For example, based on the U.S. Census Bureau's Longitudinal Research Database (LRD), McGuckin and Gguyen (1995) find that the acquired firms are generally associated with productivity above the average.

Girma and Görg (2003) look into electronics and food sectors in the U.K. to hypothesize that firm level factors also influence the probability of being acquired by a foreign owner. They find that older firms in both electronics and food industries are more likely to be acquired by foreign firms. They also find that the productivity effect matters in electronics industry but has no impact in the food industry. The size of the firm, measured by the number of employees, has no impact on both the industries.

In an investigation of how foreign acquisitions affects productivity in Swedish manufacturing firms by using a probit estimation, Karpaty (2005) also finds evidence that firm characteristics affect the probability of a domestic firm being the target of foreign multinationals. They find that more export intensive,

capital-intensive and R&D intensive firms are more likely to be acquired by foreign investors. However, in contrast to Girma and Görg (2003), they find that age is negatively related to acquisition. In fact, the age variable has different interpretations. On the one hand, younger firms may more easily be integrated into the multinationals, as they are more flexible and adaptive to the ownership transition. On the other hand, older firms have accumulated experience which should give them an advantage over the younger firms. Furthermore, compared to the results in the U.K., they find no evidence at all for the 'cherry picking' hypothesis as the profitability of the firm and productivity are statistically insignificant in the probit model.

In line with the previous studies focusing on firm characteristics, we examine whether a range of firm level variables determines the probability of a domestic firm being acquired by foreign multinationals in China. In this paper, firm characteristics thought to influence the probability of foreign acquisition are labour productivity, export intensity, capital intensity, size and age of the firm. New to the literature, this paper offers the first evidence on the impact of domestic firm heterogeneities on foreign acquisition in China.

2.2 Determinants of the mode of acquisition: whole acquisition versus partial acquisition

Apart from their importance in acquisition decisions in general, institutions have also been regarded as one of the deciding factors in the choice of the mode of acquisition, namely full-acquisition or partial-acquisition. One strand of the literature, such as by Williamson (1979), Crawford and Alchian (1978) underlines that sharing the ownership (Joint Venture) is costly due to a number

of reasons such as coordination and transaction costs. If these transaction costs cannot be avoided by contracting due to weak institutions or insufficient market disciplinary forces, firms may tend to choose vertical integration (wholly-owned affiliate). Motivated by this idea, a few empirical studies have focused on the institutional impact on the choice of ownership mode of acquisition and found evidence to support the theoretical prediction. For example, Aseidu and Esfahani (2001) empirically examine the ownership decision and find that the high quality of law reduces the probability of choosing a wholly-owned affiliate based on 2011 observations from 388 U.S. parent firms in 46 countries.

Fan *et al.* (2009) examine the institutional determinants of vertical integration by looking at companies listed on the Shanghai and Shenzhen stock exchanges from 2001 to 2003. They measure provincial legal property rights protection using an index that is developed by Fan and Wang (2001, 2002, and 2003) spanning the years from 2001 to 2003. It reflects the frequency of lawsuits and the efficiency of courts in each province or special district. Based on the results in OLS regressions and Heckman regressions, they conclude that firms are more vertically integrated in regions with weak legal property rights protection and poor quality government. However, their investigation does not have an FDI context as their sample firms are limited to the listed large companies in China and does not include foreign-owned enterprises.

Another strand of the literature focuses on incentive issues which are addressed in property rights model. It argues that, with the improvement of contract enforcement, firms are less willing to leave the ownership to the co-owner. Hence, joint ownership is chosen if contracting enforcement is weak and wholly owned ownership is preferred if the institution becomes better. There

are also some pieces of empirical work which have found evidence to support this argument. For example, both Javorcik and Wei (2009) and Hebous and Ruf (2010) find that a high level of corruption in the host country induces more joint ventures. Kamal and Lovely (2010) take China's WTO accession as an opportunity to observe the multinational companies' response to the improvement in property rights protection in a developing country. Using an adaptation of Feenstra and Hanson's (2005) property rights model, they especially examine whether a joint venture in China makes a transition to a domestically owned firm or a wholly foreign-owned firm, or remains unchanged. By applying multinomial logit tests of the property rights theory, they find robust evidence to show that the WTO accession has facilitated a more toward wholly foreign-owned firms. One problem here is that WTO accession is a questionable way to measure institutions, and hence contract enforcement. There are probably other factors which change over time and are also correlated to the ownership mode of acquisition. In this paper, we contribute to this literature by using a region-year level institutional measure to test whether intra-country institutional quality affects the ownership mode of acquisition.

In addition to institutional quality, the efficiency of the acquiring firm is also frequently identified as an important factor determining the mode of acquisition. Existing literature has focused on how the productivity of the multinational companies has affected their choice of ownership modes, namely wholly-owned or partially-owned. Intuitively, more efficient multinationals prefer wholly-owned affiliates to jointly-owned ones, for efficiency gains considerations. Mugele and Schnitzer (2008) develop a model in which the multinational investors decide the ownership mode of their affiliates. With an

assumption that the investors face the costs of control that vary with sectors and with increase in distance, they find that the more efficient multinationals prefer wholly-owned affiliates to joint ventures as they are better in covering the costs. Empirically, by looking at German outbound FDI with a binary logit mode, Hebous and Ruf (2010) find that efficiency measured by the ratio of total revenue to total balance sheet, is negatively related to the probability of joint ownership of German multinationals. consistently, with a sample of 1,512 observations of Japanese foreign investment in 22 countries from 1985 to 2001, Raff *et al*. (2009) suggests that the most productive multinationals will not choose joint ventures. To summarize the existing literature, little work has been done to evaluate how the domestic firms' pre-acquisition characteristics are related to the ownership mode of the acquisition. In this paper, we investigate how the productivity of the acquired firm, along with a range of other firm pre-acquisition performance variables, affects the ownership structure by using the Chinese firm-level data.

To summarise, we contribute to the existing literature mainly in two ways. First of all, although country-level institutional quality has been documented as an important factor in determining the prevalence of acquisition FDI and the mode of foreign acquisition, more disaggregated regional level evidence using firm-level data has not yet been investigated, perhaps due to the limitation of data availability. Taking advantage of the richness of the Chinese firm level data, and the large variation of institutional quality within China both across provinces and over time, we fill this gap by revealing how local institutional quality may affect foreign acquisition. Secondly, although the multinational firms' pre-acquisition characteristics have been intensively examined in the literature, little has been

done to investigate how the domestic firms' pre-acquisition characteristics affect foreign acquisition. Our paper, as far as we are aware, studies for the first time what firm characteristics affect the likelihood and ownership mode of foreign acquisition of domestic firms in China.

3 Empirical methodology

In this section, we describe our empirical strategy and main econometric specifications.

3.1 Econometric specifications

Following the empirical literature on foreign acquisition, for example, Karpaty (2005) and Hebous and Ruf (2010), we estimate the determinants of foreign acquisition, as well as the mode of foreign acquisition, by using binary discrete choice models. For that purpose, we apply logit models to estimate the likelihood of acquisition. The baseline regression specifications are as follows:

$$
\begin{aligned}
&\mathrm{ODDS}\left(D_{it}^{acq}=1\right)\\
&\quad=\alpha+\beta_1\left(Institu_{r,t-1}\right)+\beta_2\left(For_{jr,t-1}\right)\\
&\quad+\beta_3\left(Awage_{jr,t-1}\right)+\beta_4\left(GDP_{r,t-1}\right)\\
&\quad+\beta_5\left(Labprod_{i,t-1}\right)+\beta_6\left(employee_{i,t-1}\right)\\
&\quad+\beta_7\left(Exshare_{i,t-1}\right)+\beta_8\left(Caplab_{i,t-1}\right)+\beta_9(Age_{it})\\
&\quad+\gamma_1 DhighCaplab_j+\gamma_2 DhighRD_j\\
&\quad+\gamma_3 Year\_Dummies_t+\gamma_4 Province\_Dummies_r\\
&\quad+\gamma_5 Industry\_Dummies_j+\epsilon_{it}
\end{aligned}
\qquad \text{(Eq.2-1)}
$$

$$
\begin{aligned}
&\mathrm{ODDS}(D_{it}^{woe}=1)\\
&\quad=\alpha+\beta_1\left(Institu_{r,t-1}\right)+\beta_2\left(For_{jr,t-1}\right)\\
&\quad+\beta_3\left(Awage_{jr,t-1}\right)+\beta_4\left(GDP_{r,t-1}\right)\\
&\quad+\beta_5\left(Labprod_{i,t-1}\right)+\beta_6\left(employee_{i,t-1}\right)\\
&\quad+\beta_7\left(Exshare_{i,t-1}\right)+\beta_8\left(Caplab_{i,t-1}\right)+\beta_9(Age_{it})\\
&\quad+\gamma_1 DhighCaplab_j+\gamma_2 DhighRD_j\\
&\quad+\gamma_3 Year\_Dummies_t+\gamma_4 Province\_Dummies_r\\
&\quad+\gamma_5 Industry\_Dummies_j+\epsilon_{it}
\end{aligned}
\qquad \text{(Eq.2-2)}
$$

where i indexes firm, t indexes year, j indexes industry, and r indexes region (province).

3.2 Dependent variables

We define the binary dependent variables indicating the probability of being acquired or not as:

$$D_{it}^{acq} = \begin{cases} 1, \text{if the domestic firm } i \text{ is foreign acquired at } t; \\ 0, \text{if the domestic firm } i \text{ remains domestic at } t. \end{cases}$$ [6]

In the same manner, we define a binary variable representing the mode of being acquired as:

$$D_{it}^{woe} = \begin{cases} 1, \text{if the domestic firm } i \text{ is wholly foreign acquired at } t; \\ 0, \text{if the domestic firm } i \text{ is partially foreign acquired at } t. \end{cases}$$ [7]

The dependent variables are logarithms of the odds ratios to allow for linear estimations as in Eq. (2-1) and (2-2):

$$ODDS\left(D_{it}^{acq} = 1\right) = \log\left[\frac{\Pr\left(D_{it}^{acq}=1\right)}{1-\Pr\left(D_{it}^{acq}=1\right)}\right] \quad \text{(Eq.2-3)}$$

$$ODDS\left(D_{it}^{woe} = 1\right) = \log\left[\frac{\Pr\left(D_{it}^{woe}=1\right)}{1-\Pr\left(D_{it}^{woe}=1\right)}\right] \quad \text{(Eq.2-4)}$$

3.3 Independent variables

We specify the probability of acquisition, which takes place between two periods $t-1$ and t, as a function of two sets of variables measured in period $t-1$: one reflecting regional institutional quality; and the other reflecting firm characteristics, such as labour productivity and total employment. The probability of being acquired as wholly foreign-owned firms versus partially

[6] As we will define in Section 4, foreign acquired firms are those firms that have seen an increase in foreign ownership from below 25% to above 25% between $t-1$ and t. In the appendix, we also present regression results with different thresholds (10% , 50% and 75%) to define foreign acquisition according literature.

[7] As we will define in Section 4, wholly foreign acquired firms are those firms that have seen an increase in foreign ownership from below 25% to above 100% between $t-1$ and t.

foreign-owned firms is modelled in the same way. More specifically, $\mathrm{Institu}_{r,t-1}$ is the logged quality of property rights protection in region r, at year $t-1$; $\mathrm{Exshare}_{i,t-1}$ is the export share of firm i at year $t-1$; $\mathrm{employee}_{i,t-1}$ is the logged number of employment of firm i one year before the acquisition; $\mathrm{Labprod}_{i,t-1}$ and $\mathrm{Caplab}_{i,t-1}$ are the logged labour productivity and capital intensity of the firm. Labour productivity is defined as the value added, weighted by the number of employees, while capital intensity is calculated by the fixed asset weighted by the number of employees. Age_{it} is the firm age; $\mathrm{DhighCaplab}_{j,t-1}$ is a dummy that measures whether the firm is in capital-intensive sector or labour intensive sector. It takes on the value of one if the industry's capital intensity is above the median of all industry, and zero in other cases. $\mathrm{Awage}_{jr,t-1}$ and $\mathrm{For}_{jr,t-1}$ are the logged average wages and logged foreign presence of industry j, in region r, at time $t-1$; foreign presence is defined as the ratio of the sales of foreign firms to the total sales of an industry in a region. $\mathrm{GDP}_{r,t-1}$ is the logged GDP per capita in region r, at time t; we assume that the acquisition decision is based on all the determinants at the pre-acquisition time. Therefore, we lag all time-variant independent variables by one year.

We include regional foreign presence to provide control for the possibility of foreign firm agglomerations attracting foreign acquisitions. Regional industry's average wages are added in as a proxy for the average labour cost. Regional GDP per capita is introduced to capture provincial economic development over time. Additionally, we include the industry capital intensity and R&D intensity dummies to account for the potential role of differences in the nature of capital intensity and R&D intensity across industries. These variables

are treated as a comprehensive set of control variables which is not correlated with the institution quality and firm heterogeneity. They help us to isolate the causal effect of the institutional quality and firm heterogeneity on the acquisition and modes of foreign ownership. Thus, the results are more likely to reflect true causal effects in our investigation.

However, there may be some other unobserved factors across time, regions, or industries - such as favourable tax policy to foreign ownership in some regions, which affect the acquisition probability, and correlate with key explanatory variables of interest. To tackle this problem, dummies are included when appropriate to provide control for the above time-, region-, and industry- specific effects. Specifically, the year dummy captures the overall time trend of the probability of being acquired, which is common to all firms. For example, the increasing openness of national policies may enhance the attractiveness of Chinese firms to overseas investors. Region dummies are added to provide control for the unobserved province-specific factors that may be correlated with both the covariates (such as institutional quality) and the acquisition probability. For example, provincial government policies in special economic zones may significantly influence the prevalence of foreign acquisition and the mode of foreign ownership. The introduction of region dummy controls for these provinces corrects for this effect. Furthermore, two-digit industry dummies are used in order to correct the potential bias caused by the possibility that firms in some industries are more likely to be acquired anyway. In China, regulations and policies guiding the approval of foreign acquisitions vary from industry to industry, so the associations between acquisition probability and firm

characteristics could be entirely industry specific. [8]

ϵ_{it} is assumed to be an independently and identically distributed error term with normal distribution and mean zero. Since a mixture of industry and regional variables are used in all of the empirical exercises of this chapter, clustered standard errors are applied to identify significance level. Having found that the majority variation of the institutional quality is explained by regional differences, the standard errors is clustered at region level to control for correlation of regression errors within provinces. Note that foreign acquisitions are assumed to be based on the consideration on performances of all determinants in the past. Thus all time-variant independent variables are lagged by one year to capture the characteristics of firms and regions prior to the acquisition.

Moreover, to examine whether the effect of institutions varies across industry characteristics, we create interaction terms between industry characteristics and institutions, which are constructed as follows:

$$IndKLinsti_{jrt} = DhighCaplab_j \times Institu_{rt}, \text{(Eq. 2-5)}$$

$$IndRDinsti_{jrt} = DhighRD_j \times Institu_{rt} \quad \text{（Eq.2-6）}$$

Where $DhighCaplab_{jt}$ is the dummy that equals one if the industry capital intensity is higher than the industry median, and zero in other cases. $DhighRD_j$ is the dummy that equals one if the industry R&D intensity is higher than the industry median, and zero in other cases. We then include these two

[8] Foreign investors have no access, or only a limited access to ownership in nuclear power plants, aerospace, chemicals etc.

additional interaction terms into specification (1) and (2) with binary logit models.

It has been explained in a large body of theoretical and empirical literature that the presence of foreign investment may vary substantially depending on the characteristics of the industrial sector in the host country. The literature on the determinants of FDI (e.g. Markusen, 1995) has stressed that profit maximising firms will successfully locate an affiliate in a foreign country only if they have some advantage with respect to local producers. Since China is a developing country, the most likely kind of advantage of foreign firms with respect to Chinese competitors is on capital and technological grounds. As a result, we use industry capital intensity and industry R&D intensity, in conjunction with institution variables, to investigate how the institutional effects on acquisition vary across sectors.

More importantly, since the institution variable is region-year specific, the inclusion of region-year dummies will make institution impact unidentifiable. To overcome this problem, we allow institution variables to vary across industries within each region-year cell by allowing it to interact with industry characteristics, namely capital intensity and R&D intensity indicators. In other words, because of this additional dimension of variation created in new interaction terms, institutional effect is now identifiable even after providing controls for all region-year fixed effects. With a further assumption that industry differences do not vary across regions, our measure better reflects the true causal effects of institutional impact on acquisition probability.

4. Data and descriptive analysis

4.1 Data sources and variables

The main firm-level data we use is China Annual Survey of Industrial Enterprises maintained by the National Bureau of Statistics of China (NBS). It contains detailed information on firms' identification code, production and accounting data, which is based on the annual accounting survey of all state-owned enterprises and those non-state-owned enterprises, which had an annual turnover of 5 million Chinese Yuan or more for the period 2000-2005. The information reported to the NBS should be quite reliable for two reasons. First, because the NBS has implemented standard procedures in the national income accounts since 1995 and has strict double checking procedures for firms that had an annual turnover of 5 million Chinese Yuan. Hence, it is much less subject to manipulation. Secondly, firms do not have clear incentives to misreport their information to the NBS, because such information cannot be used against them by other government agencies, such as the taxation authorities.

On average, we have about 190,000 firms per year in our sample period, spanning 31 provinces or province-equivalent municipal cities. In addition to the detailed information about the characteristics of the firm, the dataset includes the firms' industry affiliation (at the GB/T code four-digit level), age (based on the reported opening year), size (including employment, sales, value-added sales and capital stock, etc.) and foreign equity share of the firm[9]. Furthermore, the NBS provides every firm in the dataset with a legal identification number and specifies its ownership mode. Firms are classified into one of the following six primary

[9] Foreign equity share excludes shares held by Hong Kong, Macao and Taiwan firms. It is because that many of investments from HMT are originally created in PRC, then flight into HMT but finally round-tripping back to PRC.

categories: state-owned enterprises (SOEs), collective firms, private firms, mixed-ownership firms, foreign firms, and Hong Kong, Macao and Taiwan firms.[10] Firms with foreign investments are recoded into three ownership modes: wholly foreign-owned enterprises, equity joint ventures and contractual joint ventures.

Our institutional quality is measured as the quality of intellectual property rights protection for 31 Chinese provinces for the period 2000-2005, sourced from the NERI Index of Marketisation of China's Provinces (2009 report) from National Economic Research Institute, China Reform Foundation. We focus on protection of property rights since it is arguably the most important aspect of the institutional climate (North, 1991; Acemoglu *et al.*, 2001; Besley and Ghatak, 2009). NERI constructs the indicator of intellectual property rights protection from two sub-indices.[11] The first one is the number of applications for intellectual property rights protection weighted by the number of the technical staff. The second one is the number of approvals of intellectual property rights protection divided by the number of the technical staff. Although, the indicator cannot fully capture institutional quality, it substantially reflects the legal environment of property rights protection. Arguably, the higher the willingness of the technical staff to apply intellectual property rights protection in a province, the stricter the law for the intellectual property rights protection enforced in that region, and therefore, we may expect better institutional quality and contractual environment. In other words, the indicator is positively related to the contractual environment and hence institutional quality. Since our measure of institutional

[10] The NBS does not treat publicly listed companies in China separately, which are all grouped under the mixed-ownership category. By the end of 2005, there were about 1,300 publicly listed companies in China's two stock exchanges. Only slightly over 700 of them were manufacturing firms.

[11] Please refer to Fan and Wang (various years) for the details of how these sub-indices are synthesised into a single indicator.

quality is measured from two sub-indexes with the principal components analysis, one limitation of the measure is that the weight of the sub-indexes is artificially defined. This raises a concern about the potential bias. Another limitation of the institutional measure is that the score of the institutional quality is ordinal. Thus it is meaningless in scale and hard to interpret the meaning of the unit change of the institutional quality. However, one noticeable advantage of this indicator is that it varies across both regions and over time, and is recorded from 1997 to 2007, which covers our sample period.

In the literature, rule of law is commonly used in studies such as Hebous and Ruf (2010). Asiedu and Esfahani (2001) use the indicator of enforceability of government contracts across countries. Kamal and Lovely (2010) use China WTO accession as an indicator of institutional improvement. However, to the best of our knowledge, direct measures of the institutional measures across Chinese provinces and time are not available. Regional openness is employed in Amiti and Javorcik (2008) as a proxy for the regulation environment in China, which varies across regions and over time. However, we believe that many other issues apart from institutional quality such as preferential policies may capture openness. To summarise, given the importance of institutional development over time during our sample period, one clear advantage of our measure of property rights is that our indicator measures institutional quality at both the regional and year levels

Table 2-1 summarises the definitions and the sources of the variables employed in our study. The first two variables are independent variables which are to be included in the binary logit model. Four variables in the middle are explanatory variables referring to regional institutional quality and other regional

variables. The third block of variables consists of independent variables reflecting the basic firm characteristics. Finally, the remaining variables are other control variables. The way we construct these variables, as well as our empirical methodology, is described in detail below.

Like Dollar and Wei (2007), we rely on information on the equity held by foreign firms, rather than firm registration type, to identify the ownership mode of foreign affiliates. In this paper, foreign acquisition is defined as if the foreign share increases from below 25 percent a year before to above or equal to 25 percent. Furthermore, two ownership modes of foreign acquisition are crucial to our study, wholly foreign-owned acquisitions and equity joint venture acquisitions. They are defined as follows:

- If 100% of the equity of a domestic firm is acquired by foreign investors, the acquired firm is defined as a wholly foreign-owned enterprise.
- If more than 25% but less than 100% of the equity is bought by a foreign firm, the acquired affiliate is classified as an equity joint venture enterprise.

The choice of 25% as the threshold for defining foreign affiliates is because the National Bureau of Statistics of China defines foreign affiliates as firms in which 25% or more equity shares are held by foreign multinationals. It is worth mentioning that the two modes of foreign ownership, wholly foreign-owned enterprises and equity joint ventures, are regulated under different laws and regulations. A wholly owned enterprise is a limited liability entity solely owned and operated by the foreign investor. The foreign firm bears all of the costs and

risks of the venture and equally receives all after tax profits, while the equity joint venture is a limited liability company in which control is based on the proportion of equity shares held by the foreign company and the remaining parties. Noting that the proportion of equity shares held by the foreign company and the remaining parties indicates different level of the control of the acquired firm. In literature[12], a threshold of the 50 percent is commonly used with focus on the majority level of the voting right. Our study takes 10 percent, 50 percent and 75 percent as the alternative thresholds for defining foreign acquisition as a robustness check of main empirical analysis. Regression results are shown in the appendix.

At the firm level, production efficiency is frequently suggested as an important factor determining foreign acquisition and the ownership mode. In our study, productivity is captured by labour productivity. It is expressed as the logarithm of the total value added divided by total employment.[13] As mentioned in Section 2, it is expected to have a positive impact on the prevalence of foreign acquisition. Moreover, since most current studies are investigating acquiring firms, how productivity of the acquired firms, prior to the acquisition, affects the choice of ownership mode is to be examined in our investigation.[14]

With regard to other aspects of firm characteristics, *export intensity* is defined as the share of exports to the total sales. Firm *size* is measured by the logarithm of the number of employees in the firm. Firm *capital intensity* is the logarithm of the total fixed assets scaled by the total number of employees. Finally, we subtract the year of the firm's establishment from the year of

[12] Such as Bandick, and Görg (2009); Du and Girma (2009); Karpaty (2005)
[13] All values are normalised to 1999 price index.
[14] Theoretical and empirical studies find efficiency of the acquiring firm to have a negative impact on partial acquisition and positive impact on full acquisition.

observation to refer the operating *age* of the firm. Referring to Section 2, we expect the firms' export intensity, size, and capital intensity to have a positive impact in our study of foreign acquisition. Age effect is ambiguous in previous studies. We will investigate what impact it has on the prevalence of foreign acquisition in China. Furthermore, while little has been done in the previous studies to examine how these factors determine the mode of ownership structure, we explore the impact of these firm characteristics on the probability of being fully acquired versus jointly owned by foreign firms in the second part of our empirical analysis.[15]

[15] Karmal and Lovely (2010) find no evidence that smaller firms are more likely to transit to WOE. Raff, Ryan and Stahler (2008) find no evidence that the affiliate age has an impact on the ownership.

Table: 2-1 Definitions and Sources of Variables

Variable	Definition	Variation Level	Source
D^{acq}	Dummy that takes the value 1 if foreign share reaches 25% And 0 if foreign share remains less than 25%	Firm-Year	China Annual Survey of Industrial Enterprises
D^{woe}	Dummy that takes the value 1 if foreign share reaches 100% And 0 if foreign share increase to more than 25% but less than 100%	Firm-Year	China Annual Survey of Industrial Enterprises
Regional Institutional environment	Regional Intellectual property rights protection.	Region-Year	The NERI Index of Marketisation of China's Province
Foreign Presence	Ratio of foreign sales to total sales of an industry in a region	Region-Industry-Year	China Annual Survey of Industrial Enterprises
Average Wages	Ratio of industrial real wages in a region to the number of employees in the industry and region	Region-Industry-Year	China Annual Survey of Industrial Enterprises
Regional GDP per Capita	Ratio of regional real GDP to population	Region-Year	China Annual Survey of Industrial Enterprises
Firm Export Share	Ratio of firm export to total sales	Firm-Year	China Annual Survey of Industrial Enterprises
Firm Employment	Number of firm employees	Firm-Year	China Annual Survey of Industrial Enterprises
Firm Labour productivity	Ratio of firm value-added to number of employees	Firm-Year	China Annual Survey of Industrial Enterprises
Firm K/L Ratio	Ratio of firm fixed assets to number of employees	Firm-Year	China Annual Survey of Industrial Enterprises
Firm Age	Length of firm operating years	Firm-Year	China Annual Survey of Industrial Enterprises
Indu. K-intensity Dummy	Dummy that takes the value 1 if capital intensity is higher than median and 0 otherwise	Industry-Year	China Annual Survey of Industrial Enterprises
Indu. R&D intensity dummy	Dummy that takes the value 1 if R&D intensity is higher than median and 0 otherwise	Industry-Year	China Annual Survey of Industrial Enterprises

4.2 Descriptive analysis

4.2.1 Foreign acquisition in China

In all, there were 12,204 acquisitions by foreign-owned firms during the sample period (1.89% of all the firms) according to 25% threshold, and these were relatively evenly split between acquisitions as joint ventures (5,906 acquisitions) and acquisitions as wholly owned firms (6,298 acquisitions).

In Table 2-2, we show how the acquisition activity by foreign multinationals varies significantly across geographic dimensions in the data. Table 2-2 shows that, although acquisitions appear to occur in all the regions, they are concentrated in Guangdong, Shanghai, Jiangsu, Zhejiang, Fujian and Shandong. These six regions together accounted for about 82% of the acquisitions that took place, with Shanghai and Guangdong accounting for around 25% each. The second and the third columns illustrate the number of firms which were acquired to become joint ventures or wholly foreign-owned enterprises. The total number of each type of firms is almost evenly balanced, with 5,906 firms and 6,298 firms each. However, there were also some noticeable differences across regions. We observe that more firms were acquired as joint ventures rather than wholly foreign-owned enterprises in most regions except Shanghai, Fujian and Guangdong.

In the final column, we ensure that the second column adequately represents the geographical spread of industrial activity in China by presenting the number of acquisitions as a percentage of the number of firm-year observations within the dataset. The average proportion of acquisitions is 1.9% of the firm year observations. The greatest concentration of foreign entry was observed in Shanghai, which was 8.99%. The proportions for Guangdong and Fujian were

4.04 and 2.69, respectively. The differences across the other regions were much smaller. In general, acquisitions were more likely to take place in the coastal regions. The overall rates of acquisition in the central regions of China were, in contrast, far below the mean.

In Table 2-3, we repeat the same exercise separately based on the broad industry in which the acquired and green-field affiliates operate. Results in Table 2-3 show clear industry heterogeneity. In general, acquisitions took place across all of the broad industry groups, except in the manufacturing industry of tobacco, and were less concentrated industry-wise as compared to the pattern of regional differences. Measured in terms of the number of acquisitions and percentage of acquisitions in total firms, acquisitions took place most intensively in the industries of textiles, wearing apparel, tanning and dressing of leather, furniture, sports goods, chemicals, rubber, plastics, electrical machinery, as well as communications equipment and computers. In the second and third columns, we differentiate the acquisition mode in the results. We find less variation in industries than across regions. Focusing on those industries which have relatively a large number of acquisitions, we find that the two modes of acquisition are split almost evenly. Only the industries of furniture, tanning, plastics and communications were more likely to be acquired as wholly owned enterprises as compared to joint ventures.

Table 2-2: Foreign Acquisition by Location

Province	Acquisitions	Acquired as JVs	Acquired as WOEs	Intensity of Acquisition (%)[a]
Beijing	227	147	80	2.13
Tianjin	322	165	157	2.92
Hebei	176	151	25	1.05
Shanxi	32	27	5	0.41
Inner Mongolia	28	23	5	0.80
Liaoning	325	268	57	1.85
Jilin	72	50	22	1.21
Heilongjiang	59	41	18	0.98
Shanghai	2965	1102	1863	13.5
Jiangsu	1337	860	477	2.28
Zhejiang	804	657	147	1.37
Anhui	82	58	24	0.90
Fujian	783	291	492	4.63
Jiangxi	83	41	42	0.97
Shandong	771	499	272	1.86
Henan	142	110	32	0.68
Hebei	137	93	44	0.94
Hunan	114	76	38	0.77
Guangdong	3323	936	2387	6.22
Guangxi	99	74	25	1.41
Hainan	24	13	11	2.42
Chongqing	39	34	5	0.83
Sichuan	109	71	38	0.91
Guizhou	20	14	6	0.49
Yunnan	35	30	5	0.90
Tibet	5	5	0	0.79
Shaanxi	40	32	8	0.80
Gansu	14	11	3	0.26
Qinghai	4	3	1	0.44
Ningxia	7	6	1	0.61
Xinjiang	16	13	3	0.58
Total	**12,204**	**5,906**	**6,298**	**2.73**

Note. [a] Intensity of acquisition is the proportion of acquisitions with the total number of domestic firms in a province.

Table 2-3: Foreign Acquisition by Industry and Mode

Industry	Acquisitions	Acquired as JVs	Acquired as WOEs	Intensity of Acquisition (%)[b]
Mining and Quarrying	70	54	16	0.27
Processing of food	445	285	160	1.27
Manufacture of food	318	164	154	2.21
Manufacture of beverages	182	120	62	1.73
Manufacture of tobacco products	0	0	0	0
Manufacture of textiles	858	434	424	1.92
Manufacture of wearing apparel	1242	585	657	4.22
Tanning & dressing of leather	513	228	285	3.95
Manufacture of wood	201	110	91	1.84
Manufacture of furniture	212	79	142	3.57
Manufacture of pulp paper	240	113	127	1.38
Publishing & printing	184	114	70	1.31
Manufacture of sports goods, musical instruments, game, toy and sta.	357	130	227	4.81
Manufacture of coke & refined petroleum	32	22	10	0.93
Manufacture of chemicals & products	687	357	330	1.43
Manufacture of pharmaceutical goods	231	153	78	1.80
Manufacture of man-made fibres	74	41	33	1.94
Manufacture of rubber products	160	74	86	2.59

Note. [b] Intensity of acquisition is the proportion of acquisitions with the total number of domestic firms in a industry.

Table 2-3: Foreign Acquisition by Industry and Mode (Continued)

Industry	Acquisitions	Acquired as JVs	Acquired as WOEs	Intensity of Acquisition(%)[b]
Manufacture of plastic products	763	276	487	2.77
Manufacture of other non metallic minerals	537	316	221	0.96
Manufacture of basic metals	81	57	24	0.68
Manufacture of non-ferrous metals	128	83	45	1.22
Manufacture of other metals	747	338	419	2.08
Manufacture of general purpose machinery & equipment	605	303	302	1.47
Manufacture of special purpose machinery	415	176	239	1.68
Manufacture of transport equipment and products	449	246	203	1.61
Manufacture of electrical machinery	786	367	419	2.19
Manufacture of communications equipment & computers	882	300	582	5.04
Manufacture of medical & optical instruments	234	92	142	3.23
Manufacture of crafts	424	198	226	2.97
Recycling	16	10	6	3.19
Electricity, gas and water	126	97	29	0.48
Total	**12,199**	**5,903**	**6,296**	**2.71**

Note. [b] Intensity of acquisition is the proportion of acquisitions with the total number of domestic firms in a industry.

4.2.2 Regional institutions

Table 2-4 shows that coastal regions such as Shanghai, Guangdong, Zhejiang, Jiangsu and Tianjin ranked at the top in the index of intellectual property rights protection throughout the sample period where acquisitions were more likely to take place. In general, coastal regions are among those have best institutions and western regions are those have poorest institutions. Ranked in the middle are those central regions. Furthermore, there were no big jumps for the most regions over the period. Therefore, over the period, coastal regions remain institutional advantages over central and western regions.

In Figure 2-1, we examine how much the institutional climate varies between regions and across time. We have compared the intellectual property rights institutional environment in 1997 and in 2007. First, how far the province is from the origin at x-axis and y-axis indicates how good the regional institutional climate was in the year 2000 and 2007 respectively. Combined with the evidence from the firm-level data, we find that the regions that have more acquisitions also have better institutional quality. Secondly, we find that all the regions are above the 45-degree line, which indicates that the institutional improvements did take place in all the provinces. Finally, the distance from the 45-degree line indicates how much the institutions improved in each region. Particularly, we observe that intellectual property rights institutional environment in the coastal regions such as Shanghai, Guangdong, Zhejiang, Jiangsu and Tianjin improved much faster than the other inland or hilly regions.

To summarise, the data shows that there are large regional differences in our measure of institutional quality. First, the level of the institutional quality has a significant regional dimension. Second, the institutional qualities of Chinese

provinces have also improved unevenly over time. The regional differences in institutional improvement share many similarities with the regional differences in acquisition, as shown in the firm-level data. It confirms the finding that the institutional quality varies widely across China (Du *et al.*, 2008; UNCTAD, 2008), and that China's economic development has been concentrated in certain regions where institutions appear to be better.

Table 2-4: Provincial Ranking of Institutional Quality

Ranking	1999	Ranking	2001	Ranking	2003	Ranking	2005
Beijing	1	Shanghai	1	Shanghai	1	Shanghai	1
Guangdong	2	Beijing	2	Guangdong	2	Guangdong	2
Tianjin	3	Guangdong	3	Zhejiang	3	Zhejiang	3
Shanghai	4	Zhejiang	4	Beijing	4	Tianjin	4
Hainan	5	Tianjin	5	Tianjin	5	Jiangsu	5
Fujian	6	Jiangsu	6	Jiangsu	6	Beijing	6
Jiangsu	7	Fujian	7	Fujian	7	Fujian	7
Zhejiang	8	Liaoning	8	Liaoning	8	Liaoning	8
Jilin	9	Heilongjiang	9	Shandong	9	Shandong	9
Shanxi 14	10	Hainan	10	Heilongjiang	10	Heilongjiang	10
Liaoning	11	Shandong	11	Xinjiang	11	Hebei	11
Shandong	12	Jilin	12	Sichuan	12	Sichuan	12
Anhui	13	Sichuan	13	Jilin	13	Anhui	13
Heilongjiang	14	Inner Mongolia	14	Hubei	14	Chongqing	14
Hebei	15	Xinjiang	15	Hainan	15	Hubei	15
Ningxia	16	Hebei	16	Inner Mongolia	16	Xinjiang	16
Guangxi	17	Henan	17	Hebei	17	Jilin	17
Hubei	18	Hubei	18	Chongqing	18	Henan	18
Inner Mongolia	19	Guangxi	19	Guangxi	19	Inner Mongolia	19
Henan	20	Shanxi 14	20	Shanxi 14	20	Shanxi 14	20
Jiangxi	21	Anhui	21	Hunan	21	Jiangxi	21
Qinghai	22	Chongqing	22	Henan	22	Hunan	22
Sichuan	23	Hunan	23	Jiangxi	23	Shanxi 61	23
Guizhou	24	Jiangxi	24	Anhui	24	Yunnan	24
Gansu	25	Yunnan	25	Shanxi 61	25	Guangxi	25
Yunnan	26	Tibet	26	Yunnan	26	Hainan	26
Xinjiang	27	Guizhou	27	Tibet	27	Tibet	27
Chongqing	28	Shanxi 61	28	Ningxia	28	Ningxia	28
Shanxi 61	29	Ningxia	29	Guizhou	29	Gansu	29
Hunan	30	Qinghai	30	Gansu	30	Guizhou	30
Tibet	31	Gansu	31	Qinghai	31	Qinghai	31

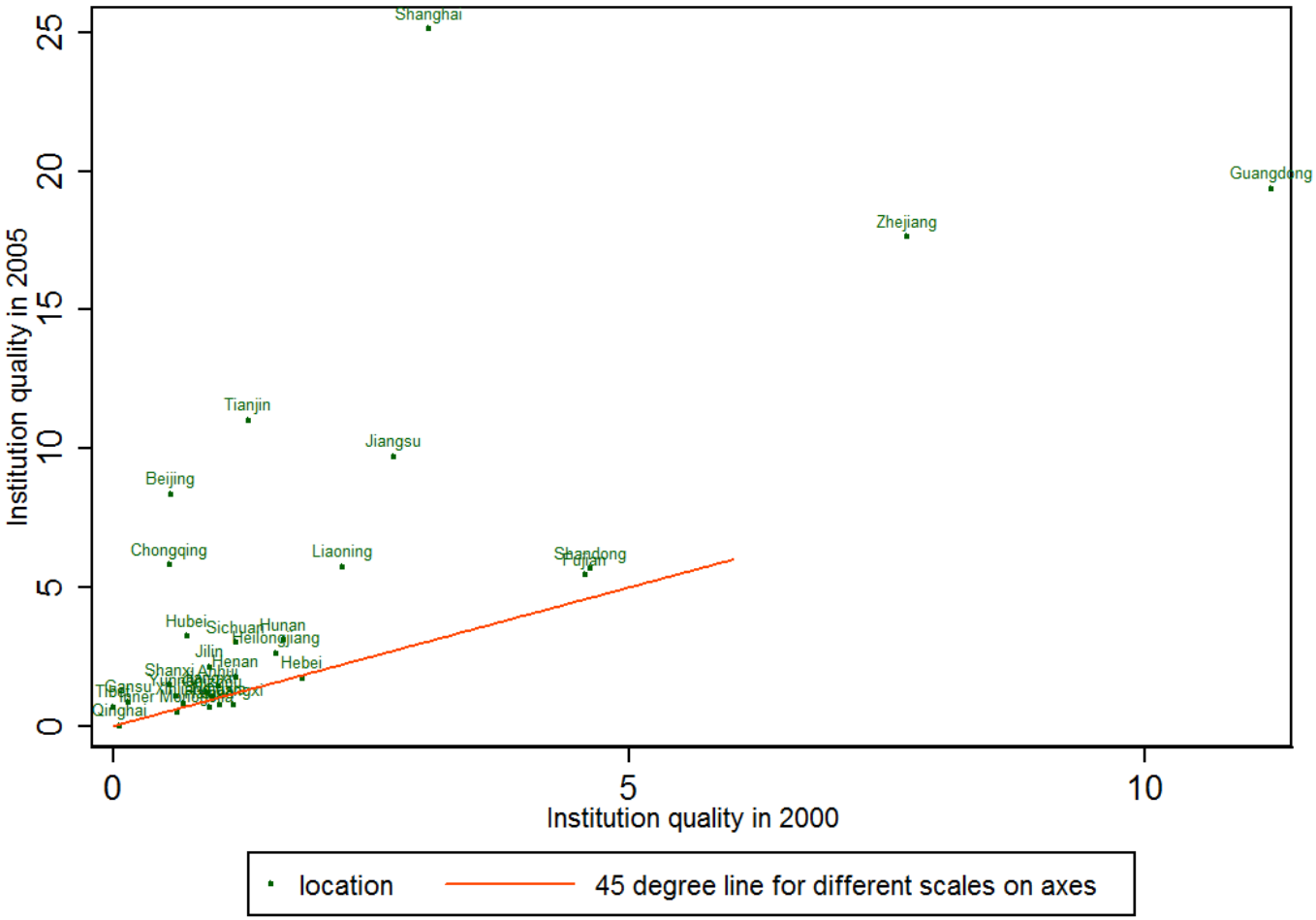


Figure 2-1: Regional Institutional Improvement (2000-2005)

4.3 Summary statistics

Table 2-5 presents the summary statistics including means and standard deviations of the included explanatory variables that we have investigated. Within the table, we report the mean and standard deviations of the region and firm characteristics, including regional institutional quality, foreign presence, average regional industrial wages, GDP per capita, firm labour productivity, firm export employment and firm export intensity, for each group of acquired and non-acquired domestic firms. In columns 3 and 4, we present an extension of this exercise to show the summary statistics for the partially acquired firms and the wholly acquired firms. Table 2-5 shows that there is a clear distinction among four different ownership types of firms. For example, we can see that acquired firms are more likely to be located in a province with better institutions. Better institutions encourage more partially foreign acquired firms. Furthermore, we observe that the average efficiency is the highest for the wholly acquired firms.

Table 2-6 presents the coefficients of correlation between the explanatory variables. The coefficients of correlation between firm characteristics are relatively small. Institutional environment is positively correlated with foreign presence, regional industrial wages and regional GDP per capita. The correlation between the regional GDP per capita and institution is positive and rather high (0.80). It implies that more economic developed regions appear to have better institutional quality. Intuitively, the economic development benefits from an improvement in institution, and fast economic growth demands better institutional environment. Notably, the coefficient of correlation of industry capital intensity and firm export intensity is negative (-0.23).

To investigate how much of the variation in the institutions is due to

cross-regional and over-time differences, we run a simple regression in which the institution variable is regressed on year dummies, region dummies, year and region dummies, and year-region dummies, respectively. Table 2-7 presents R-square which is a descriptive measure of how well the institution variables are explained by the year and region variations. We find that about 88% variation of institutional quality is explained by regional differences and 12% variation of institutional quality comes from changes over time.

Table 2-5: Descriptive Statistics of Variables

	Non-acquired		Foreign acquired		Wholly acquired firms		Partially acquired firms	
	Mean	Standard Dev.	Mean	Standard Dev.	Mean	Standard Dev.	Mean	Standard Dev.
Institution	1.21	1.14	1.98	0.93	1.74	0.98	2.23	0.80
Foreign presence	-2.39	1.37	-1.72	1.08	-1.80	1.11	-1.65	1.06
Regional industrial wages	2.27	0.49	2.52	0.47	2.46	0.50	2.57	0.43
Regional GDP per capita	0.20	0.57	0.63	0.57	0.52	0.59	0.74	0.53
Firm export Intensity	0.14	0.48	0.40	0.48	0.34	0.43	0.48	0.51
Firm employment	4.87	1.15	5.09	1.14	5.12	1.10	5.05	1.17
Firm labour productivity	-0.55	1.08	-0.24	1.10	-0.18	1.06	-0.30	1.13
Firm K/L ratio	-0.77	1.25	-0.31	1.27	-0.31	1.21	-0.31	1.32
Firm age	21.64	126.23	11.77	90.71	13.05	91.77	10.45	89.61
Indu. K-intensity dummy	0.60	0.49	0.50	0.50	0.54	0.50	0.46	0.50
Indu. R&D dummy	0.39	0.49	0.38	0.49	0.37	0.48	0.39	0.49

Note. All variables are logged variables except firm export share and firm age, variance between 0 and 25

Table 2-6: Coefficients of Correlations between Variables

	Regional Institutions	Firm export Intensity	Firm employment	Firm labour productivity	Firm K/L ratio	Firm age	Indu. K-intensity dummy	Indu. R&D dummy	Foreign Presence	Region industry wage	Region GDP per capita
Institution	1										
Firm export Intensity	0.1445	1									
Firm employment	-0.079	0.1456	1								
Firm labour productivity	0.0583	-0.0205	-0.1611	1							
Firm K/L ratio	0.0351	0.0095	0.0005	0.3334	1						
Firm age	-0.0469	-0.0173	0.0216	-0.0159	0.0047	1					
Indu. K-intensity dummy	-0.14	-0.233	-0.0809	-0.0134	-0.0557	0.0212	1				
Indu. R&D dummy	0.0567	-0.0728	-0.03	-0.0018	-0.0155	-0.0037	0.1551	1			
Foreign Presence	0.2659	0.114	-0.029	0.0207	0.0509	-0.0199	-0.1	0.1286	1		
Region industry wage	0.4699	-0.0032	-0.0693	0.0804	0.0413	-0.0233	0.1631	0.2597	0.2325	1	
Region GDP per capita	0.8043	0.0878	-0.1185	0.0751	0.0504	-0.0406	-0.099	0.0992	0.3466	0.5487	1

Table 2-7: How Institution Varies across Regions and over Time

Dummy	R-Square
Region	0.8756
Year	0.1163

5. Empirical results

5.1 Determinants of acquisition: acquired firms versus domestic firms

Table 2-8 presents results from the binary logit model. In non-linear models, we report the marginal effect so that each coefficient can be interpreted in terms of elasticity. Robust heteroscedasticity-corrected clustered standard errors are reported in parentheses. We interpret the impact of the host country's regional institutions and effects of acquired firm characteristics on the prevalence of foreign acquisition in China as follows:

5.1.1 Regional institutional impact on foreign acquisition

Model (1) in Table 2-8 is the benchmark model with inclusion of time, industry and province controls. As it is shown in column (1), the co-efficient of institutional environment is positive and significant, indicating that improvements in regional institutions and higher regional foreign firms' activity, regional average wages and regional GDP, have a significant and positive impact on the prevalence of foreign acquisitions within China across industries. This finding is consistent with literature

that has pointed out bad institutions are identified as impediments that undermine FDI attractiveness[23]. For example, after looking at FDI scenario in Africa, Asiedu (2006) suggests that weak and inefficient institutions have a negative impact on the flow of FDI to Africa. Bénassy-Quéré *et al*. (2007) also found robust results which show that the impact of an improvement in the quality of institutions may result in an increase of FDI inflows in a sample of 52 countries.

Furthermore, we notice that the marginal effect of institutional quality on the probability of foreign acquisition is about 0.00637. An improvement in the institutional quality by one standard deviation (i.e. by 0.93) [24] raises the propensity to attract foreign acquisition by slightly less than 0.64 percentage point. Compared to other factors, it contributes about 36 percent to the overall probability of being acquired.[25] In the context of China, we have above 470,000 observations over a period of five years.[26] Therefore, it means that about 602 more domestic firms are likely to be acquired by foreign firms if the institutional quality improves by one standard deviation.[27]

[23] There are potential endogeneity issue that is possible to cause reverse causality between acquisition FDI and institution. A better institutional quality attracts acquisition FDI, while acquisition FDI may have positive effects on institutions. To deal with this issue, we lagged institutional quality in our regressions to reduce the effect of reverse causality. Furthermore, we find that most variation of the institutional quality is from regional dimension rather than time dimension. Thus we believe that the reverse causality between acquisition and institution has limited effects on the interpretation of the results in general.

[24] Please refer to Table 2-5.

[25] We find the overall probability of being acquired is about 1.8 percentage points in Section 3.

[26] The source data are available from the year 2000 to 2005. However, a change in ownership depends on lagged characteristics that lead to a loss of the first year a firm is observed in. Therefore we exclude the year 2000 from the regression analysis.

[27] It is calculated as 470000/5*0.15%.

Table 2-8: Logit Model of Acquisition: Marginal Effects

	Dependent Variable: For all Firms: Acquired firm=1&Domestic firm=0				
	(1)	(2)	(3)	(4)	（5）
Regional	0.00637***	0.00713*	0.00631**	0.00715*	0.00695***
Institutions	（0.00054）	(0.00205)	(0.00178)	(0.00205)	（0.00054）
Foreign Presence	0.00243***	0.00244***	0.00257***	0.00257***	0.00314***
	（0.00016）	(0.00036)	(0.00033)	(0.00033)	（0.00019）
Average Wage	0.00341***	0.00327***			0.00314***
	（0.00041）	(0.00075)			（0.00041）
Regional GDP per	-0.02770***		-0.02655**		-0.01325***
Capita	（-0.00323）		(0.00804)		（-0.00289）
Firm Export Share	0.00796***	0.00796**	0.00791**	0.00791**	0.00888***
	（0.00194)	(0.00274)	(0.00273)	(0.00274)	（0.00192）
Firm Employment	0.00334***	0.00335***	0.00339***	0.00339***	0.00362***
	(0.00021)	(0.00053)	(0.00051)	(0.00052)	(0.00024)
Firm Labour	0.00176***	0.00178**	0.00186**	0.00187**	0.00175***
productivity	(0.00014)	(0.00059)	(0.00060)	(0.00060)	(0.00014)
Firm K/L Ratio	0.00303***	0.00301***	0.00307***	0.00305***	0.00307***
	(0.00011)	(0.00013)	(0.00013)	(0.00013)	(0.00011)
Firm Age	-0.00060***	-0.00060***	-0.00060***	-0.00060***	-0.00063***
	(-0.00002)	(0.00003)	(0.00003)	(0.00003)	(-0.00002)
Indu. K-intensity					0.00001
Dummy					(-0.00051)
Indu. R&D					0.00089**
intensity dummy					(0.00032)
Year Dummy	Yes	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	No
Observations	474,482	474,482	474,482	474,482	474,482

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Independent variables are logged except export share and all dummies.

Since the correlation matrix in Table 2-6 identifies that regional institutions, regional GDP per capita and regional average wage are highly correlated, it raises a concern about the potential bias of the co-linearity has on the estimated effect of the institutional quality. To check if this is the case, we exclude regional GDP per capita

in column (2), regional average wage in column (3), and both of them in column (4).

With exclusion of the regional GDP per capita, the results show a increase in the size of the estimated effect of the institutional quality from 0.00637 to 0.00713 in column (2). So the GDP per capita is positively related to the institutions but negatively related to the probability of acquisition, which is consistent with findings in the correlation matrix and results in the column (1). Importantly, the effect of the institutional quality remains significantly different from zero. In column (3) with drop of the regional wage, we observe that the coefficient of regional institutional quality varies very little as compared to previous columns. In column (4), both regional GDP per capita and regional wage are excluded. The coefficient of the effect of institutional quality shows an increase in the size, but the effect still remains significantly from zero.

Turning to other explanatory variables, we explore the effect of other regional variables on the attractiveness of foreign acquisition. We observe that the regional foreign presence, which is a proxy for the quality of the investment climate, is positively correlated with foreign acquisition. Domestic firms in those provinces, which have higher foreign firm activities, are more attractive to foreign investors due to agglomeration benefits. It may imply that the competition of foreign investors for resources or congestion externalities has not yet outweighed the benefits of being in a province with many other foreign firms present. The result is consistent with the argument put forward by Amiti and Javorcik (2006) in the case of China.[28] They

[28] In their paper, the dependent variable is measured by number of foreign firms.

indicate the importance of 'scale effects' for the increase in FDI. As they point out, the greater the amount of investment, the greater the confidence of others to invest. Tseng and Zebregs (2002) also find robust evidence that suggests positive relationship between foreign firms' presence and prevalence of foreign entry in China.

The coefficient of average industrial wages in a region is positive and statistically significant in all the specifications. It shows that higher average industrial wages in a region facilitate more foreign acquisition. The implication of this result is an assertion that, in recent years of fast economic development, China has not attracted foreign investment only through low labour costs. As reflected in the model of Branstetter and Feenstra (2002), multinational firms in China tend to pay a premium on wages to their workers. This may be because multinational firms desire to hire quality workers. The higher wages may well reflect higher labour productivity. Hence, it is conceivable that wages in those provinces that can attract relatively more FDI can be higher too. Apart from that, the Chinese *hukou* (household residence registration) system, which restricts the mobility of labour across provinces, was weakened during the 1990s, raising concern that provincial wages could potentially be endogenous. We address this issue by estimating the model with provincial fixed effects. However, we find neither change of sign, nor any changes of significance on the magnitude of the wage variable with this modification.

Finally, regional GDP per capita also plays a role in the entry decision. Interestingly, we find that the coefficient of regional GDP per capita is negative and statistically significant in all specifications that GDP per capita is included. In the past

empirical studies, market size was found to be a significant and positive determinant of FDI. It is pointed out that one of the motivations of FDI is to look for a new market. The larger the market size of a particular province, other things being constant, the more FDI the province should attract. Cheng and Kwan (2002), Tseng and Zebregs (2002) and Zhang (1999) indicate, in their research, that empirical studies have found a strong positive correlation between GDP and FDI inflows especially at the country level. However, we observe that the coefficient becomes negative and significant. Indeed, GDP per capita can be interpreted as economic development, which may be positively related to costs. For example, more developed regions are subject to higher land costs. Thus for foreign investors who are driven by a search for lower costs, the domestic firms in relatively less developed provinces may be more attractive due to lower acquisition costs.

5.1.2 What impact does firm heterogeneity have on foreign acquisition?

Continuing with the next regressors in Table 2-8, we examine whether pre-acquisition firm heterogeneity affects the likelihood of being acquired. At the first glance of Table 2-8, we find that more productive, export intensive, capital-intensive and younger domestic firms are more likely to be acquired by foreign firms. However, because acquisitions are rare events in total number of firms in China, the marginal effects are relatively small.

Turning to firm labour productivity and firm size, we find that the acquired firm's pre-acquisition labour productivity and the number of employees are positive

and significant in all specifications[29]. In column (1), an increase in productivity by one standard deviation raises the propensity to attract foreign acquisition by 0.18 percentage points compared to the 1.8 percentage points overall. The result shows that acquired firms behave differently from those that remain domestically owned. The higher the pre-acquisition productivity and the size of the domestic firm, the more likely it is to be acquired. It reconciles well with previous studies such as McGuckin and Nguyen (1995) in which they argue that the buyer should 'cherry pick' their targets, and accordingly choose the firms with the highest productivity.

The coefficients of export intensity in all specifications are positive and statistically significant. It suggests that Chinese domestic firms with higher exporting intensity are more likely to be foreign acquired. If the export share increases by one standard deviation, the probability of acquisition increases by 0.8 percentage points. The result accords with the theoretical prediction that one motive of FDI is to establish an export platform, as found by Ekholm *et al.* (2003), Grossman *et al.* (2004) and Yeaple (2003). Empirically, Girma *et al.* (2005) conclude that the U.K. firms with higher exporting intensity are more likely to be foreign takeover targets.

In previous empirical investigations, firm capital intensity, which is measured by firm capital labour ratio, has also been found to have an important impact on the likelihood of foreign acquisition. Girma *et al.* (2008) find evidence of cherry picking which shows that acquired firms have a higher capital labour ratio. Karpaty (2005)

[29] The region dummies have been included in the baseline specification to control for regional specific effects. For example, firms located in the coastal regions in China are more productive and larger than firms located in the inland regions. Therefore, the introduction of regional dummy isolates the regional differences in size and productivity.

also confirms that the capital labour ratio is positively related to foreign entry. In our study, we find that the coefficient of capital intensity is positive and significant at the 0.1% level in column (1) to (4). Although the marginal impact of firm capital intensity is small, as acquisition is a rare event, in the data set the magnitude is steady across all specifications. The result suggests that the more capital-intensive the domestic firm was prior to acquisition, the more likely it was to be acquired by foreign firms. Apparently, the more capital-intensive firms are more labour productive. So the result echoes the cherry picking hypothesis that acquirers choose their targets with the highest survivor possibility, and hence with the best firm performance.

In Table 2-8, we also find that the age of the domestic firm is related to the probability of being acquired by foreign firms negatively and significantly. With regard to our results in column (1), the effect of age has different interpretations. On the one hand, a younger firm may be less rigid and resistant to acquisition by outsiders. On the other hand, according to the cherry picking hypothesis, an older firm has accumulated experience that is thought to give it an advantage over the younger ones. Our investigation on Chinese firms confirms the first explanation and rejects the cherry picking prediction on the part of the acquiring firms. Empirically, by analysing FDI in Sweden, Karpaty (2005) also finds that the younger firms, on the margins, are more likely to become takeover targets.

5.1.3 Industry impact on foreign acquisition

Now we discuss whether pre-acquisition industrial characteristics have an impact on the prevalence of foreign merger and acquisitions. In column (5), we exclude industry dummy to allow us to estimate industry impact on foreign acquisition. The conventional argument about the capital labour ratio is that multinationals based in rich countries might allocate their more labour-intensive production to their affiliates in less developed countries, while concentrating their more capital-intensive or skill-intensive operations at home (Lipsey, 2004). Furthermore, during the past 30 years, China is widely referred to as a 'world factory' or 'labour-intensive manufacturing country'. The perceivable result is that more labour intensive industries in China attract more foreign investors. However, in Table 2-8, we notice that the industry capital intensity variable is insignificant, so we find no evidence to suggest that the industry capital intensity has an impact on the likelihood of being acquired. In fact, in the recent years of fast economic development, China has not attracted foreign investment only by providing unskilled or semi-skilled labour.

Next, we investigate how industrial R&D intensity determines the likelihood of a domestic firm being acquired by a foreign firm. In Table 2-8, we observe that R&D intensity dummy is positive and statistically significant in column (2). The size of the effect is relatively small though. The result shows that domestic firms in more R&D intensive industries are more likely to be foreign acquired. It is consistent with the argument that multinationals possess technological advantages. In more R&D intensive industries, technological advantages are more obvious. Thus domestic firms

are more likely to sell equity to multinational firms to fill the technology gap.

5.1.4 Regional institutional effect revisited in interaction terms

Notably, another important empirical issue is that we find asymmetric institutional improvement across regions over time from Figure 2-1. Institutional qualities in the Coastal regions improve much faster than in the inland regions. Therefore, some region-time specific factors may cause bias in the estimation of the true causal effect. In this sub-section, we will overcome these empirical issues by adding industry-region-time level interaction terms of institution and industry variables with region-year level dummy to provide control for of our regression.

As we have discussed above, with the use of year-region fixed effects, the variation in new measures allows us to isolate all region-year specific factors and estimate how institutional effects vary across industries. Furthermore, with the assumption that regional factors over time have no preference to attract certain industries, our modification better measures the true causal effect of how the institutional effect on the probability of being foreign acquired depends on industry characteristics. Furthermore, this modification not only helps us to tackle region-time specific factors, it also shows that the regional institutional impact varies across industries. Therefore, we carry out the same analysis as our baseline regression by adding interaction terms of industry level capital labour intensity and R&D intensity dummies with respective regional institution variables as we have described in Section 3. Results are shown in Table 2-9.

Table 2-9: Logit Model of Acquisition with Interaction Terms between Institutional Quality and Industrial Capital Intensity and R&D Intensity: Marginal Effects

	Dependent Variable: For all firms: Acquired firm=1&Domestic firm=0				
	(1)	(2)	(3)	(4)	(5)
Regional Institutions	0.00585*** （0.00056）		0.00591*** （0.00056）		
(Indu. KL)*(Region Institution)	0.00111*** （0.00032）	0.00067*** (0.00028)			0.00088** (0.00028)
(Indu. R&D)*(Region Institution)			0.00105*** （0.00025）	0.00052* (0.00027)	0.00026 (0.0003)
Foreign Presence	0.00240*** （0.00016）	0.00242*** (0.00017)	0.00241*** （0.00016）	0.00243*** (0.00015)	0.00241*** (0.00016)
Average Wage	0.00334*** （0.00041）	0.00305*** (0.00044)	0.00333*** （0.00042）	0.00324*** (0.00043)	0.00302*** (0.0004)
Regional GDP per Capita	-0.02735*** （-0.00323）		-0.02781*** （-0.00319）		
Firm Export Share	0.00795*** （0.00193）	0.00744*** (0.00189)	0.00793*** （0.00193）	0.00738*** (0.00192)	0.00745*** (0.0019)
Firm Employment	0.00334*** （0.00021）	0.00328*** (0.00020)	0.00334*** （0.00021）	0.00328*** (0.00021)	0.00328*** (0.00021)
Firm Labour productivity	0.00176*** （0.00014）	0.00158*** (0.00013)	0.00177*** （0.00014）	0.00158*** (0.00012）	0.00158*** (0.00013）
Firm K/L Ratio	0.00302*** （0.00011）	0.00289*** (0.00009)	0.00303*** （0.00011）	0.00287*** （0.00010）	0.00289*** （0.00011）
Firm Age	-0.00060*** （-0.00002）	-0.00058*** (-0.00002)	-0.00060*** （-0.00002）	-0.00058*** （-0.00002）	-0.00058*** （-0.00002）
Year Dummy	Yes	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Year*Region Dummy	No	Yes	No	Yes	Yes
Observations	474,469	474,469	474,469	474,469	473595

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Independent variables are logged except interaction terms, export share and all dummies.

In Table 2-9, columns (1) and (2) present the likely result of the introduction of

the interaction terms of capital intensity and institutional environment into baseline regression. Time, region and industry fixed effects are controlled by dummies in column (1). In column (2), we apply region, year and region-year pair specific dummies along with the use of an industry fixed effect. It is a very demanding fixed effect control. It removes all factors that are common to firms within each region-time pair that affect the acquisition probability. Interestingly, in both column (1) and (2), we find that the coefficient of the interaction term is positive and statistically significant. The result confirms that the improvement in regional institutions has a significant and positive effect on the prevalence of foreign acquisition within China.

Furthermore, as implied by column (1), in high capital-intensive industries, the institutional impact on the probability of being acquired is a remarkable 20% higher than in low capital-intensive industries.[30] The sensitivity test shows that the marginal institutional impact on the probability of being acquired has stronger positive effect in the more capital-intensive industries. In column (2), with control of all time-region fixed effects, we find that, an improvement in the institutional quality by one standard deviation raises the propensity to attract foreign acquisition by 0.07 percentage points more in highly capital-intensive industries than in low capital-intensive industries. It is a notable result given that the overall probability of being acquired is only 0.18 percentage points. Intuitively, capital-intensive industries, such as manufacture of metals and chemical products involve a high level of fixed costs. So, the more capital-intensive the industry is, the greater the demand for legal protection from the

[30] It is calculated as 0.00111/0.00585*100%.

foreign investors. The improvement of institutional quality provides a better legal environment to protect property rights on assets. Thus, the likelihood of acquisition is more sensitive to the improvement in institutional environment in the case of capital-intensive industries, than in the case of labour-intensive industries.

We further investigate how improvement in regional institutions has an impact on the probability of being acquired across different R&D intensive industries. We replicate our basic analysis by introducing the interaction of the high industry R&D intensity dummy with the regional institutions. In column (3), time, region and industry dummies control fixed effects. In column (4), we apply region, year and region-year dummies along with the use of an industry fixed effect. We find that the interaction term is positive and statistically significant if we control for the regional specific fixed effect in columns (3) and (4). It confirms our results in Table 2-8 which show that the improvement in regional institutional environment encourages foreign acquisition.

Column (3) of Table 2-9 tells us that the marginal institutional impact on the probability of being acquired has stronger positive effect in more R&D intensive industries. Actually, based on a calculation of the coefficients, the institutional impact in highly R&D intensive industries is about 18% higher than in low R&D intensive industries.[31] In column (4), on controlling all time and region fixed effects, we find that, with an improvement in the institutional quality by one standard deviation, the propensity to attract foreign acquisition rises by 0.05 percentage points more in highly

[31] It is calculated as 0.00105/0.00591*100%.

R&D intensive industries as compared to low R&D intensive industries. Actually, the costs to enforce intellectual property rights protection in R&D intensive industry, such as manufacture of communications equipment, computers and pharmaceutical products, are higher if institutions are weaker. As a result, foreign investment in highly R&D intensive industries is more sensitive to the improvement in regional institutions. Furthermore, comparing the results of the first column and the third column, we find that the institutional impact due to being in a more capital-intensive industry is higher than its due to being in a more R&D-intensive industry. More precisely, this difference is further confirmed in column (5) where both the interactions are included and industrial R&D intensity seems to have no significant effect on the institutional effect.

5.2 Determinants of the mode of acquisition: wholly acquired versus partially acquired

We repeat our investigation method to examine how the improvement of regional institutional quality and the acquired firm heterogeneity have an impact on the ownership form of acquisition. To interpret regression results of these logit models, we report the marginal effect corresponding to each coefficient so that our results can be interpreted in terms of elasticity. Robust heteroskedasticity-corrected clustered standard errors are reported within parentheses.

5.2.1 Baseline result: regional institutional impact on the likelihood of being wholly acquired

First of all, as Table 2-10 shows, the institutional environment plays a statistically significant and negative role for the domestic firms to be acquired as wholly owned foreign enterprises when all fixed effects are included in column (1). This is consistent with the previous empirical findings, such as those of Fan *et al*. (2009) and Aseidu and Esfahani (2001). They all find evidences that a better institutional environment induces partial ownership of the affiliate. In fact, the transaction cost model argues that, with the improvement of contract enforcement, coordination and transaction costs for sharing the ownership decline. Thus better institutional quality leads to a prevalence of joint ventures compared to wholly foreign owned firms.

Since regional institutions, regional GDP per capita and regional average wage

are evidently co-linear right-hand side variables, we conduct the robustness analysis to check the sign and significance of the estimated coefficient on the regional institution variable to the exclusion of regional GDP per capita, regional average wage or both in column (2), column (3) and column (4) respectively. The results show a limited reduction in the size of the estimated effect of the institutional quality on WOEs, but the effect still remains significantly different from zero.

We further introduce interaction terms between institution and industry specific characteristics into our analysis with year, region and region-year level dummies providing control for all time-variant regional differences. Intuitively, since this new interaction term varies at the year-region-industry level, we are able to identify institutional impact even while controlling for all region-year unobservable factors with year-region dummies. Results are reported in Table 2-11.

Interestingly, we find that the coefficients of interaction terms in columns (1) and (2) are negative and statistically significant. Generally speaking, the propensity of a domestic firm to be wholly acquired is 4 percentage points lower in a highly capital-intensive industry than in a low capital-intensive industry, given a common improvement in the institutional quality by one standard deviation. Intuitively, joint ventures incur coordination costs if legal property rights protection is weak, while this cost is in absence in wholly foreign owned firms. In more capital-intensive industries, this transaction cost is higher. Thus, partially acquired firms will be more likely to appear respect to the improvement of institutional environment. It is worth mentioning that another strand of the literature underlines that acquiring firms gain

residual rights of control over the assets by providing control for full ownership. These control rights are assumed to help retain profits and reduce technological spill over. According to this argument, we should expect the institutional impact on full acquisition to be stronger in more R&D intensive industries. However, we do not find evidence to support this argument. One explanation is that a large number of foreign acquisitions in China are clustered in low R&D industries. The protection of technology may not be a primary concern for those foreign investors. As shown in column (5), the above conclusions continue to hold when we include both of the above-mentioned interactions into our regression.

Table 2-10: Logit Model of Mode of Acquisition: Marginal Effects

	Dependent Variable: For all acquired firms: WOEs=1&JVs=0				
	(1)	(2)	(3)	(4)	(5)
Regional	-0.00352***	-0.00652***	-0.00452***	-0.00852***	-0.00352***
Institutions	(0.00167)	（0.00182）	（0.00172）	（0.00184）	（0.00152）
Foreign	-0.00543	-0.00568	-0.00637	-0.00635	0.00225
Presence	(0.0061)	(0.00507)	(0.00607)	(0.00607)	（0.00577）
Average Wages	-0.03049	-0.02331			-0.03242
	(0.01844)	(0.01854)			（0.01808）
Regional GDP	0.27714		0.25721		0.42115**
per Capita	(0.17261)		(0.17245)		（0.14384）
Firm Export	0.09350***	0.09359***	0.09412***	0.09418***	0.09839***
Share	(0.01406)	(0.01405)	(0.01405)	(0.01405)	（0.01378）
Firm	-0.01625**	-0.01624***	-0.01636**	-0.01636**	-0.01512**
Employment	(0.00546)	(0.00546)	(0.00546)	(0.00546)	（0.00527）
Firm Labour	-0.02436***	-0.02463***	-0.02502***	-0.02506***	-0.02568***
productivity	(0.00565)	(0.00564)	(0.00564)	(0.00564)	（0.00556）
Firm K/L Ratio	0.01596***	0.01614***	0.01563***	0.01588***	0.01402**
	(0.00457)	(0.00454)	(0.00457)	(0.00456)	(0.0045)
Firm Age	-0.01660***	-0.01661***	-0.01662***	-0.01664***	-0.01670***
	(0.00157)	(0.00159)	(0.00157)	(0.00158)	(0.00156)
Indu.					-0.04759***
K-intensity Dummy					(0.01239)
Indu. R&D					0.03976**
intensity dummy					(0.01322)
Year Dummy	Yes	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	No
Observation	10,822	10,829	10,825	10,825	10,825

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Independent variables are logged except export share and all dummies.

Table 2-11: Logit Model of Mode of Acquisition with Interaction Terms between Institutional Quality and Industrial Capital Intensity: Marginal Effects

	Dependent Variable: For all Acquired Firms: WOEs=1&JVs=0				
	(1)	(2)	(3)	(4)	(5)
Regional Institutions	0.0137		-0.01078		
	(0.02624)		(-0.0257)		
(Indu. KL)*(Region Institution)	-0.03869**	-0.04285**			-0.04708**
	(-0.01337)	(-0.01401)			(-0.01432)
(Indu. R&D)*(Region Institution)			0.01194	0.00832	0.01572
			(0.01074)	(0.0112)	(0.01141)
Foreign Presence	-0.00394	-0.00541	-0.00541	-0.00665	-0.00587
	(-0.00611)	(-0.00625)	(-0.00612)	(-0.00626)	(-0.00627)
Average Wage	-0.03862*	-0.02822	-0.04321*	-0.03839*	-0.02956
	(-0.01835)	(-0.02002)	(-0.01839)	(-0.01946)	(-0.02004)
Regional GDP per Capita	0.26654		0.2624		
	(0.17231)		(0.17193)		
Firm Export Share	0.09374***	0.09188***	0.09307***	0.09078***	0.09173***
	(0.01412)	(0.01417)	(0.01405)	(0.01407)	(0.01415)
Firm Employment	-0.01630**	-0.01708**	-0.01616**	-0.01665**	-0.01697**
	(-0.00546)	(-0.00551)	(-0.00546)	(-0.00552)	(-0.00551)
Firm Labour productivity	-0.02446***	-0.02468***	-0.02420***	-0.02446***	-0.02455***
	(-0.00564)	(-0.00579)	(-0.00565)	(-0.00579)	(-0.0058)
Firm K/L Ratio	0.01607***	0.01662***	0.01632***	0.01679***	0.01669***
	(0.00458）	(0.00464)	(0.00458)	(0.00464)	(0.00464)
Firm Age	-0.01654***	-0.01690***	-0.01658***	-0.01690***	-0.01689***
	（-0.00157）	(-0.00158)	(-0.00157)	(-0.00158)	(-0.00158)
Year Dummy	Yes	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Year*Region Dummy	No	Yes	No	Yes	Yes
N	10,822	10,741	10,822	10,741	10,741

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Independent variables are logged except interaction terms, export share and all dummies.

5.2.2 Firm productivity impact on the likelihood of being wholly acquired

Turning to the effects of firm-level characteristics on the mode of foreign acquisition in Table 2-10, we find that labour productivity has a statistically significant and negative impact on the probability of being wholly acquired by foreign firms in all specifications. The size of the estimate is relatively small and remains stable at about -0.025, even when all fixed effects of time, region, and industry are controlled for. It means that an increase in the firm labour productivity by one standard deviation raises the propensity to attract partial acquisition by around 2.5 percentage points.[32] It is a supplementary result to the existing literature, which focuses on the effects of the productivity of multinationals (parent firm) on ownership choices of FDI entry. (Hebous and Ruf, 2010, Raff *et al*., 2009, and Mugele and Schnitzer, 2008) They all find that more efficient parent firms prefer wholly owned affiliates to joint ventures, for efficiency gains consideration here. Our work looks at acquired firm productivity and provides results from an opposite angle. Thus, it offers a supplement to complete the story of acquisition. We explain our results from acquired firm's perspective: domestic firms are more willing to be partially acquired and retain gains if they are more productive. In contrast, domestic firms are more willing to cash out the whole amount of equity to foreign investors if they are less productive.

Regarding other firm level explanatory variables in Table 2-10, we find that firm characteristics are significant determinants of the ownership mode of foreign

[32] Please refer to the standard deviations in Table 2-5.

acquisition. Interestingly, we find that younger, smaller (in terms of number of employees), less productive and more export-oriented firms, possessing higher fixed assets, are more likely to be fully acquired by foreign investors. The result is consistent with younger export-orientated firms are having less assets and being more likely to be subjected to financial restraints to finance their production potential. Thus, they are more likely to sell to foreign investors before they develop into an established firm. We find firm level results of explanatory variables also hold in Table 2-11.[33]

6 Conclusions

Literature has stressed the importance of the quality of institutions and firm characteristics for foreign acquisition activity. Motivated by some stylised facts in China, we have conducted an empirical investigation on the determinants of the prevalence of foreign acquisition and the ownership mode of the acquired firms, using a novel firm-level dataset on foreign ownership and region-time-level institutional data on China. Our empirical work is the first to use regional improvement in institutional environment over time for this purpose. Furthermore, we consider how domestic firm's (the acquired side's) pre-acquisition characteristics affect the acquisition, while the existing theory and empirical studies are predominantly focused on the firm heterogeneity of the multinationals (the acquiring side).

Our results obtained from binary choice models have revealed interesting

[33] For all analysis, we conduct robustness checks by changing in equity share thresholds for the definition of ownership types with 50% equity threshold, replacing industry dummy variables with continuous variables, and altering binary logit model to OLS specification. Results are the same in the sign and significance.

findings regarding the determinants of foreign acquisition and the ownership mode of acquisition (wholly acquired vs. partially acquired) in China. Our results can be summarised as follows. First, we find that a better regional institutional environment has a significant and positive impact on the prevalence of foreign acquisition in China. Furthermore, this impact is stronger in capital-intensive and R&D intensive industries. Secondly, we find evidence of cherry picking in acquisition activity in China. More productive, capital-intensive and export intensive firms are more likely to be acquired by foreign investors. Thirdly, conditional on foreign acquisition norms, domestic firms are more likely to be wholly acquired as compared to being partially acquired, if they are smaller, younger, more export intensive and more capital-intensive, even if less productive. Finally, we find that in capital-intensive industries, better institutions increase the likelihood of the domestic firms being partially acquired.

Providing evidence to understand the determinants that affect the acquisition is important for various reasons. First, without understanding how institutions affect foreign acquisition, any policy reform that aims at attracting foreign investment via the acquisition route may prove to be inefficient or misdirected. Secondly, understanding the pre-acquisition firm characteristics is an important factor in understanding whether China is benefitting from an increased inflow of investments, and whether the effects of FDI on the domestic firms are positive. Our next chapter will tackle this issue by matching and comparing post- and pre- acquisition firm characteristics. Last, but not the least, our discussion with ownership variation is an important step to understand the determinants of acquisition for the further research

on the full picture of the FDI in a host economy. The mode of FDI is a combination of two decisions: the ownership mode and the investment mode. The decision on the investment mode is the choice between establishing a new firm (greenfield investment) and acquiring an existing firm (acquisition). In our further research, we will add the investment mode into our analysis and find the determinants for the FDI mode of entry in the host country.

CHAPTER 3: The Effects of Acquisition FDI on Exporting in Chinese Manufacturing

1 Introduction

Since China began its programmes of opening-up and liberalisation, the flow of inward Foreign Direct Investment (FDI) to China has increased dramatically, to the point that the country is now one of most attractive destinations for FDI. It is a widely shared view in literature that FDI promotes exports of host countries. Therefore, this paper empirically investigates whether or not foreign acquisition of Chinese indigenous enterprises increases export. If so, can China benefit from export-orientated acquisition FDI? The novelty of this research is that we assess the intra-firm consequences of FDI with use of a micro-level data.

An empirical investigation of the consequences of FDI in the export performance of any host country is important, since export is recognised in classic economic theory as a part of the driving force of economic growth. Besides the intrinsic importance of the topic, it is of special interest in the case of China, which is famous for its export-led growth model and is widely considered the most attractive destination for export-oriented FDI, earning it the epithet of 'export processing zone of the world'. China's export boom, from $18 billion in 1980 to $593 billion in 2004, was accompanied by a substantial rise in FDI inflows from almost zero to $61 billion in the same period, with the accumulated FDI being as much as $560 billion by the end

of 2004. The exports generated by foreign-invested enterprises (FIEs) rose much faster than those by domestic firms, resulting in a share of 57% in China's total exports in 2004.[1]

A wide range of literature has been published investigating export performance and other firm-level characteristics. For example, Greenaway and Kneller (2004) and Todo (2011) find that previous experience in exporting has a major effect on current exporting and can explain 90% of exporting behaviour. Therefore, it would seem obvious that export-orientated foreign acquirers will be more interested in existing exporting plants. Thus, our hypothesis is that foreign acquisition is more likely to promote export if the acquired firm is an exporter. However, more than 40% of foreign-acquired firms in China are non-exporters before acquisition. Taking into account the experience effect, it is not straightforward to identify the market orientation of a foreign acquirer in this scenario. In this study, therefore, we split our sample into acquired exporters and acquired non-exporters, in order to investigate whether acquisition FDI promotes exports in both scenarios.

If FDI stimulates export performance, we are also motivated to examine what could generate this effect and whether China benefits from export-oriented FDI. Our study is based on the following two strands of literature. First, in theory, a firm starts to export when productivity reaches a certain threshold; and empirically, many studies using firm-level data find that firms' exporting decisions are affected by their productivity level (Bernard and Jensen, 1999 and 2004; Greenaway and Kneller, 2004;

[1] Sources: China Statistical Yearbook 2004 and China Foreign Economic Statistical Yearbook 1979-2003.

etc.). Therefore, we aim to test whether foreign acquisition has an impact on productivity. In fact, it is a widely shared a view that FDI promotes the exports of host countries by a) helping the transfer of technology and new products for exports and/or b) providing training for the local workforce and upgrading technical and management skills. If this is the case, we can expect a significant improvement in productivity after foreign acquisition. The acquired firm therefore benefits from acquisition FDI. However, there is also a popular debate concerning the foreign acquisition of domestic firms: the negative aspects highlighted are that foreign acquisition may not help to develop the host country's dynamic comparative advantage if it is solely focused on local cheap labour and raw materials.[2] If China fits with this scenario, we may find that foreign acquisition has no impact on the productivity of acquired firms.

Secondly, we examine whether foreign acquisition results in a significant improvement in financial status. In theory, it is more difficult for credit-constrained firms to export, because exporting requires initial investment in marketing abroad or modification of products to suit the foreign market, etc. Some recent empirical studies, including Greenaway, Guariglia, and Kneller (2007), Du and Girma (2007), Feenstra, Li, and Yu (2011) have examined whether the financial condition of firms affects exporting decisions. In our study, we also expect an improvement in financial condition by foreign capital given the considerable financial discrimination towards local private enterprises in China. Relating to the productivity issue, financial status

[2] World Investment Report 2002: Transnational Corporations and Export Competitiveness (UNCTAD, 2002).

also has some other implications: if financial status improves, but with no improvement in productivity, the result is coherent with the argument made by Huang (2003): 'more [FDI] is actually less'. China's success in attracting FDI arouses criticism because acquisition FDI in China is seen as reflecting weaknesses in the Chinese economy, such as financial discrimination faced by local private enterprises. If we do not observe any productivity or financial improvement, we may suggest that the foreign acquirer just cherry-picks a local firm and then starts to export or increases the export share of the acquired firm based on its current efficiency and financial status. Foreign acquirers simply facilitate exports using their existing access to foreign markets.

There has been a growing literature on export and FDI in China (for example, Zhang and Song, 2001; Zhang and Felmingham, 2001; Zhang, 2005; Yao, 2006). However, most existing studies have examined the export effect of FDI depending on the use of aggregated national-, provincial- or industry-level data, assuming that foreign acquisition effects are equal across regions or industries. This methodology may produce results that dilute the true nature of the relationship and may lessen the probability of obtaining accurate empirical results. There are two reasons for this issue: first, the effects from FDI are diffused by problems of determining the direction of causality between inward FDI in an industry and firm dynamics. For example, does FDI stimulate exporting or are multinationals attracted to firms with high exporting intensity? It is difficult to answer this question with aggregate data. Second, there are time-invariant effects that are common to all firms, such as export-promoting policy,

that may cause over-estimation of the effect of foreign acquisition if cross-section data is applied. However, in our study, with available firm-level data, we are able to reveal the true export effect of the acquisition FDI on an acquired firm by comparing it to similar firms that have never been acquired. The firm-level data allows us to employ a difference-in-difference (DiD) propensity matching (PSM) estimator proposed by Heckman, Ichimura and Todd (1997, 1998). From a large sample of domestically owned firms, we choose a control group in which firms have never been acquired and have similar observable characteristics to the treated group in the pre-acquisition period for the purpose of controlling causality issue. Given that the two groups of firms are similar, the DiD estimator ensures that unobserved time invariant effects that are correlated with the selection are removed.

Research on the effect of foreign acquisition has been explored in recent years, but there are still aspects to consider. This study contributes to the existing empirical literature in at least three important aspects. First, many current studies focused on the intra-firm spillover of FDI, we investigate the intra-firm consequences of FDI with use of micro-level data. In addition, since the panel of Chinese firms used in this paper covers 6 years (2000-2005), we are able to explore the dynamic patterns of consequences of FDI.

Second, besides looking at export performance, we investigate intra-firm productivity and financial status in the post-acquisition period. We also have a discussion on whether the FDI-induced export increase results in any productivity and financial status change.

Last but not the least, our results provide firm-level evidence as to whether acquisition FDI in China is a failed policy initiative. In fact, recently the utilisation strategy for foreign capital in China has been increasingly emphasizing the quality of the FDI rather than the quantity. The rationale behind this is to benefit knowledge transfer and minimise pollution and energy-consumption. Therefore, to understand the consequences of FDI is essential from a policy perspective.

The rest of the chapter is organised as follows. In Section 2, we outline the literature that is related to our study. Section 3 describes our empirical strategy. The data are discussed in Section 4, while Section 5 presents the empirical findings. Section 6 draws conclusions and summarises the study.

2 Literature review

In this part, we start with the literature relating to acquisition FDI and its consequences, especially export performance. Then, for the purpose of identifying factors that boost export performance in China, we review the literature about the determinants of export. Finally, we have a discussion from policy perspective based on the current literature.

There are many empirical investigations about the consequences of foreign acquisition with a focus on export performance. It is an empirical question of special interest in the case of China; given that 57% of China's total exports are from foreign affiliates in 2004. Applying panel data at the provincial level in the period of 1986 to 1997, Zhang and Song (2001) show that higher FDI has a positive association with

the provincial manufacturing export performance without discussion on causal links. Based on the a monthly time series for the period 1986 to 1999 and error correction modelling techniques, Zhang and Felmingham (2001) find that bidirectional causality appears in both high FDI presence regions (coastal regions) and low FDI presence regions (western regions) in China, while exports attract FDI in median FDI presence regions (central regions). Zhang (2005) provides a cross-section analysis of the FDI-export linkage based on 186 industries in 1995. This paper confirms that FDI encourages exports in China. Furthermore, it shows that this effect is larger in labour-intensive sectors. More interestingly, with discussion of industry specific domestic capital stock, it also suggests that the export-boost effect from foreign capital is much greater than that of domestic investment. Using a large panel dataset containing 28 Chinese provinces over the year 1978 to 2000, Yao (2006) also identifies a strong and positive linkage between FDI stock and export promotion.

In a broader empirical literature, this FDI-export linkage is also found in many other countries such as Athukorala and Menon (1995) based on FDI in Malaysia; Banga (2006) based on Japanese and U.S. FDI flows in India, and so on. However, one criticism of the current literature is that it mostly uses aggregate country-, province- or sector- level data by assuming that foreign acquisition effects are equal across countries, or province, or industries. These empirical approaches therefore face two issues that may dilute the true relationship between foreign acquisitions and exports. First, aggregate data makes it difficult to tackle the direction of causality between FDI and firm dynamics. For instance, it is not able to distinguish whether

high export-intensive local firms attract foreign investors or foreign investments stimulate exporting. Second, cross-section analysis in particular cannot isolate time-invariant effects that are common to all firms, such as export-promotion policy. Therefore, with the use of firm-level data, one primary contribution of this study is to control the causality issue by a propensity matching (PSM) estimator and remove time-invariant effects by a difference-in-difference (DiD) method.

In addition to answering what role foreign acquisition plays in export performance, we raise a question about what sources could generate this effect. In general qualitative discussions, it is believed that foreign acquisition stimulates host countries' exports by providing additional capital, technology, managerial know-how and access to global markets (UNCTAD, 2002). These merits brought by FDI have also complemented host countries' resources and capabilities. From a detailed discussion on the role of FDI, the World Investment Report 2012 also suggests that export-oriented foreign affiliates provide training for the local workforce and upgrade technical and managerial skills that benefit the host countries' exports. The effect is found to be even stronger if export-motivated investments have advanced technology capabilities. To better understand why FDI can stimulate export performance, we review the literature regarding the determinants of export at the firm-level.

Theoretically, there has been a rapidly expanding literature on firm level exporting decisions and firm heterogeneity over the last decade. Our research about the issue is inspired by two streams of theory developments. First, Melitz (2003), Melitz and Ottaviano (2008) and Helpman, Yeaple and Melitz (2004), among others,

provide theoretic foundation on the participation in international markets and firm heterogeneity. In their theory, the source of firm heterogeneity is technology heterogeneity. Therefore, the productivity threshold is a key to determine whether to export. To complement theoretic approach from firm technology perspective, the availability of micro level dataset has facilitated firm level empirical analysis in many countries. Using firm-level data, Clerides, Lach and Tybout (1998), Bernard and Jensen (1999, 2004), and Greenaway and Kneller (2004) provide empirical evidence that exporting decisions are affected by, for example, firm size and productivity levels. Based on theoretical and empirical researches, most of the extensions to multinationals theory such as Markusen (2004) and Navaretti and Venables (2006) on FDI have also regarded technology as the defining attribute of multinational firms. With respect to China, Zhang and Song (2001) argue that FDI provides China with competitive assets for export-oriented production in technology intensive products. Such assets are often firm-specific, costly and difficult for the Chinese firms to acquire independently. Empirically, researches have shown that foreign acquisition leads to a productivity upgrading. Without discussion on export performance, Karpaty (2005) employs firm level data to investigate how foreign acquisition affects productivity in Swedish manufacturing firms. The study concludes that foreign acquisition increases productivity in Swedish firms and this difference does not occur immediately but starts three years post acquisition.

Secondly, some studies are particularly interested in the interaction between economic openness and corporate finance from a governance perspective.

Considerable research has pursued the evidence that firms in countries with underdeveloped financial systems are constrained in a wide variety of activities, including exporting. Intuitively, a possible linkage between financial constraints and exporting is that since exporting requires initial investment, for example, marketing abroad and modification of products to satisfy foreign preferences, it is more difficult for credit-constrained firms to export. Theoretically, Chaney (2005) develops a heterogeneous firm model, in which firms with sufficient liquidity are able to export. In his model, firms may face liquidity constraints to finance entry cost. The liquidity constraints are generated by a random liquidity shock every period. Because of insufficient liquidity, there are firms that are prevented from exporting. Aghion *et al*. (2010) develop a static model with heterogeneous, financially-constrained firms and derives implications that financially developed countries are more likely to export and export more volume in sectors which require relatively more external finance. Empirically, as firm-level data have become available in recent years, Greenaway, Guariglia, and Kneller, 2007; Du and Girma, 2007; and Feenstra, Li, and Yu (2011) have found that financial conditions of firms also affect exporting decisions. Literature on multinational firms and financial constraints is also considerable. Egger and Nelson (2011) find that debt-turnover ratio is an important factor whether foreign capital invests in domestic firms.

According to two strands of approach, firms are more likely to export when they are more productive and less credit-constrained. Thus, in this paper, if foreign acquisition boosts export, we consider the source of effect from two possible aspects:

productivity and financial constraint. Within the existing literature, the reason why foreign acquisition could generate an export-promoting effect has not previously systematically exploited by the two strands of literature. Our research contributes to the literature by filling the gap with the first firm-level empirical investigation of its kind

Our paper is also important from a policy perspective as the negative aspects of acquisition FDI in China have drawn an increasing concern from economists and policy-makers. First, UNCTAD (2002) and Caves (1996) suggest that FDI may not help developing the host countries' dynamic comparative advantages by focusing solely on local cheap labour and raw materials. It is a widely held view that exporting sectors in China are labour intensive industries. One distinctive motive behind export-oriented acquisition FDI is exploiting cheap labour and resources in China. Indeed, Zhang (2005) shows that FDI effect on export performance is larger in labour-intensive industries. Secondly, by emphasising distortions for the perfectly competition norm, there is also a worry is that export-oriented FDI in China is attracted by financial discrimination against domestic private enterprises. Provocatively, Huang (2003) claims that a large amount of FDI inflows are because of substantial weaknesses facing the Chinese economy. Especially, because of financial discrimination by the state-dominated banking system, private enterprises in China have been forced to sell their assets to foreign investors in order to realise their growth potential. He also points out that much FDI went into traditional labour-intensive industries in China, often crowding out private domestic

entrepreneurs. In an alternative approach to this issue, Egger and Nelson (2011) examine the effect of financial constraints on the willingness of Chinese firms to take foreign partners. They believe that multinational firms are large, possess internal finance, and have better access to the international capital market. Therefore, Chinese firm might finance their funding constraints by taking foreign investments. They employ firm level data (2001-2005) and find a significant impact of debt-to-turnover ratios in attracting foreign capital.

Therefore, motivated by the literature, our research aims to reveal the role of export-oriented acquisition FDI in China's economy, focusing on both firm-level productivity and financial conditions. It is a more comprehensive investigation than existing research. In fact, if we find no productivity effect but a relaxed financial constraint, we may conclude that export-motivated FDI in China is a symptom of the economy's deficiencies rather than its strength. It takes advantage of the imperfect financial system in China and exploits cheap labour and resources. From a policy perspective, this implies that not only the size of the FDI stock, but also the motive and consequences of inward FDI, are important issues for the local economy. Our research is essential for China's FDI utilisation strategy and other economic reforming policies. It is also useful for other developing countries that are seeking to encourage multinational firms.

3 Empirical methodology

To estimate the impact on export intensity of foreign acquisition of a domestic firm, we need information about the outcome in the domestic firm if it had never been acquired. Heckman and Navarro-Lozano (2004) point out that there are different methods that take into account this missing data problem and the biases emanating from the missing data such as randomisation, instrumental variables, difference-in-difference and matching methods. All these methods rely on specific assumptions for the technique to be valid.[3] Relating to our study, the 'difference-in-difference' estimation takes into account not only the difference between the acquired firms and the non-acquired firms, but also the difference within these two types of firms before and after the acquisition year. Furthermore, Blundell and Costa Dias (2000) suggest that a combination of matching and difference-in-difference analysis provides more accurate estimation for an evaluation study. Therefore, we first use a matching mechanism to construct two groups of similar firms and then apply the difference-in-difference method to estimate the export intensity effects of foreign acquisition in China.

According to Heckman and Navarro-Lozano (2004), the effect on export intensity due to an acquisition TT (treatment effect on the treated) can be described as:

[3] Randomisation can be used no matter what observables X are chosen. We rule it out since Xs are those that relevant to acquisition, i.e. selection is non-random in our analysis.
Instrumental variable is appropriate if the conditional independence does not hold. We rule it out since foreign acquisition and change in export intensity need to be independent for firms with the same set of exogenous characteristics for our analysis.

$$TT = E[(Y_{1i} - Y_{oi}|X, D_i = 1)] \qquad \text{(Eq.3-1)}$$

where Y_{1i} is post-acquisition export intensity of an acquired firm i and Y_{oi} is productivity in the same firm that had never been acquired. $D_i = 1$ if the outcome Y_{1i} (acquisition) is selected. X is the vector of observed variables that determine the acquisition. The matching mechanism that identifies the treated group and the matched control group is based on the vectorX. How we implement the matching and difference-in-difference method in our analysis is presented in the following sub-sections.

3.1 Propensity-score matching

Although a general rule that acquired firms are more export-intensive pre-acquisition has been widely documented by trade economists, one empirical problem we face is that we cannot observe the counter-factual of acquisition and export intensity: we cannot observe the outcome of being 'not acquired' (Y_{oi}) for those acquired firms. Rosenbaum and Rubin (1983) solve this type of empirical problem by using a propensity-matching mechanism. They show that the probability of an event (i.e. the acquisition in our analysis) conditioned on the observable factors can substitute for the unobservable missing data.

So, according to Rosenbaum and Rubin (1983), we construct a sample of treated and control group firms with the propensity-score matching method. The idea behind the propensity-score matching method is to use the probability of receiving treatment

(foreign acquisition) as the basis for matching a treated firm to a control firm. The untreated group should consist of firms that are similar to acquired firms but have never been acquired. Then, with two groups of similar firms, we are able to discuss the effects of acquisition on an acquired firm's characteristics such as export intensity. For each firm and year, we identify the probability of receiving treatment (or propensity score) via the following probit model

$$P(Treat_{it} = 1) = F(X_{it-1}, D_{it}) \quad \text{(Eq.3-2)}$$

where D is the full set of industry and regional dummies, and vector X consists of a range of variables in the pre-treatment period t-1. These variables, thus, control aspects of firm performance pre-acquisition that are likely to make firms attractive targets for foreign investors. In the matching process, domestic and acquired firms only participate in the matching procedure once.[4]

We believe that the proper way to match firms would be to take into account as much relevant information as possible in the data in order to track the causal influences pre-acquisition. The theoretical and empirical literature is vague in investigating relevant factors determining why a domestic firm is acquired by foreign investors. The covariates used in the probit estimation are: the firm leverage ratio, defined as the ratio of long-term liabilities to total assets; the liquidity ratio, defined as the liquid assets relative to the total assets; productivity; capital-intensity; and the size

[4] Nearest neighbour matching without replacement: 'Smith and Todd 2005': trade-off between bias and variance will be significant if the propensity score distribution is very different in the treatment and control group.

and age of the firm. Industry and regional factors are also included, such as: industry capital intensity; R&D intensity; regional foreign presence; average wage; and institution quality. The details of how we construct these variables are described in the next section.

How we identify determinants of acquisition is motivated by the existing literature. Girma and Görg (2003) use age and age squared, and size and size squared to test the hypothesis that these factors influence the probability of being acquired by a foreign owner. The age variable shows that on the one hand, a younger firm may more easily be integrated into the multinational enterprise than an older firm; on the other hand, an older firm will have accumulated experience thought to give it advantages over younger firms. In Lichtenberg and Siegel (1987) and McGuckin and Nguyen (1995), firm size is defined as log of employment and employment normalised by industry respectively. Both studies find that firm size has a positive influence on the likelihood of the acquisition. In terms of productivity, McGuckin and Gguyen (1993) show that 'cherry-picked', acquired firms are generally associated with above average productivity. Although Karpaty (2005) finds no evidence of 'cherry-picking' in foreign acquisitions in Swedish manufacturing, but demonstrates evidence that more export-intensive, capital-intensive and R&D-intensive firms are more likely to be acquired by foreign investors. As mentioned above in Chapter 1, we find that foreign investors may 'cherry-pick' plants which are high productivity, more capital-intensive, export-oriented and larger. We also find that a better institutional environment has a positive impact on foreign acquisition in China. This impact is

stronger in capital-intensive and R&D-intensive industries.

Based on the propensity score from the probit estimation, we use nearest neighbour matching with condition on a defined 'caliper'. Nearest neighbour matching is the most straightforward matching estimator, in which the matching partner for a treated observation is closest in terms of propensity score. However, it is argued that nearest neighbour matching may produce bad matches if the closest neighbour is far away. So we impose a 'caliper' as the maximum tolerance level on the propensity-score distance. In this study, the caliper is set at 0.05. We also impose a common support condition to drop observations in the treatment group whose propensity score is higher than the maximum or lower than the minimum score among observations in the control group.

In the case of this paper, the data set spans a six-year period and foreign acquisitions were taking place throughout the period. We match treatment observations with control observations in the same year, following Karpaty (2005)'s approach.

After the matching, the treatment and the control group should have similar characteristics before the foreign acquisition. To check whether this is the case, we use a *t* test to examine whether the difference of the mean of the covariates between the treatment and the control group is reduced significantly after matching. In addition, we follow Rosenbaum and Rubin (1983) and carry out a balancing test to investigate the standardised difference for all covariates. The lower the standardised difference, the more balanced the treatment and comparison groups will be in terms of covariates.

3.2 Difference-in-difference

As discussed before, the major problem in calibrating the effect of acquisition is that the selection of treatment is most likely not random: certain types of firms are selected as targets based on their pre-treatment characteristics. Ruling out possible approaches such as instrumental variable and randomisation, as we need to avoid a potential bias due to a non-random selection decision, we apply a combination of matching and difference-in-difference analysis suggested by Meyer (1995). Thus, instead of using a straightforward propensity-score matching estimator we employ the more general difference-in-differences estimator on the sample of matched firms to ensure that unobserved time invariant effects that are correlated with the selection are controlled for. In fact, the estimator to measure the treatment impact in export intensity for the acquired firms (treatment group) is biased, since the impact is also likely to be affected by other factors which are contemporaneous with the acquisition. If these factors affect the treatment group of firms and the control group of firms in a similar fashion, the differences-in-differences estimator is able to eliminate these common effects that are contemporaneous with the acquisition. For example, economic policy change, market demand change or input cost change will affect both the acquired firm and the matched control firm in the same way. Working with a longitudinal data[5] set is another reason why we use difference-in-difference estimation, which can provide more robust estimates of the impact of treatment than the instrumental variables method. The specifications of the difference-in-difference

[5] Sample observations from a large population over a given period of time.

methodology within our context are presented below.

DiD estimates the difference between pre- and post- the treatment (acquisition) for a group of firms that has received the treatment versus a group of similar firms that do not. Thus, the DiD estimator can be written as:

$$\hat{\delta}_{DiD} = (\overline{Y}_1^T - \overline{Y}_0^T) - (\overline{Y}_1^C - \overline{Y}_0^C) \quad \text{(Eq.3-3)}$$

where $\hat{\delta}_{DiD}$ is the DiD estimator that is measured as the average percentage point change in yearly levels of export intensity that can be attributed to acquisitions. $\overline{Y}_1^T$ and $\overline{Y}_1^C$ are the average outcomes for the treated T and controlled C groups, respectively. Sub-indices 0 and 1 denote before and after acquisition.

Following Blundell and Dias (2000) and Sianesi (2001), the DiD estimator when we have longitudinal data can be redefined as:

$$\hat{\delta}_{DiD}^{mm} = \sum_{i \in T}\left[\left(Y_{it_1} - Y_{it_0}\right) - \sum_{j \in C} W_{ij}\left(Y_{jt_1} - Y_{jt_0}\right)\right]\omega_i \quad \text{(Eq.3-4)}$$

where $\hat{\delta}_{DiD}^{mm}$ is the difference-in-difference estimator by using method of propensity-score matching. W_{ij} is the weight on comparison between a treated firm j and a matched counterpart control firm i. W_{ij} takes the value 1 if we match one 'nearest neighbour' control firm to each treated firm. It is more than 1 if we want to match more control firms to each treated firm. ω_i is defined as the ratio between 1 over the number of treated firms. It denotes the re-weighting that reconstructs the

outcome distribution for the treated sample. 0 and 1 denote before and after acquisition periods. t_1 and t_0 denote before and after acquisition time periods.

To implement the above methodology within a regression framework, we can estimate the following equation using matched sample, according to Ilmakunnas and Maliranta (2004):

$$Y_{it} = \beta_0 + \beta_1 acq_i + \beta_2 pacq_t + \beta_3 acq * pacq_{it} + \varepsilon_{it} \quad \text{(Eq.3-5)}$$

where Y_{it} is export intensity for a firm i at time t. acq_i is a group-specific dummy variable that takes the value 1 if the firm is among firms in the treatment group and 0 if the firm is a member of the control group. Therefore, β_1 captures the constant export intensity difference for a matched acquired firm during the sample period. $pacq_i$ is the event of acquisition dummy for each pair of treated and matched control firms. $pacq_i$ takes value 1 if time is in the pre-acquisition period and 0 if time is in the post-acquisition period. Thus, β_2 represents the export intensity variation between pre-and post- acquisition period. $acq * pacq_{it}$ is the difference-in-difference estimator which is defined as the interaction of being treated in the post-treatment period. Thus β_3 captures the impact of a foreign acquisition in export intensity after the acquisition. ε_{it} is the error term. Table 3-1 shows how the difference-in-difference estimator is constructed.

Table 3-1: The Explanation of the Difference-in-Difference Estimator

	Pre-acquisition period ($pacq_t$=0)	Post-acquisition period ($pacq_t$=1)
Control group (acq_i=0)	β_0	$\beta_0 + \beta_2$
Treated group (acq_i=1)	$\beta_0 + \beta_1$	$\beta_0 + \beta_1 + \beta_2 + \beta_3$
Difference	$\overline{Y}_1^C - \overline{Y}_0^C = \beta_1$	$\overline{Y}_1^T - \overline{Y}_0^T = \beta_1 + \beta_3$
Difference-in-difference	$\hat{\delta}_{DiD} = (\overline{Y}_1^T - \overline{Y}_0^T) - (\overline{Y}_1^C - \overline{Y}_0^C) = \beta_3$	

4 Data

4.1 Description of the data set

To analyse the post-acquisition effect, we again use China Annual Survey of Industrial Enterprises compiled by the State Statistical Bureau of China. It covers all firms with an annual turnover of no less than 5 million Chinese Yuan for the period 2000-2005. The data set has an average of about 190,000 firms per year, spanning 31 provinces or province-equivalent municipal cities. Importantly, it reports the amount of foreign share for each firm in each year so that we are able to track in the data if a foreign acquisition takes place. Furthermore, the National Bureau of Statistics of China (NBS) provides every firm with a legal identification number and specifies its ownership type into the following six primary categories: state-owned enterprises, collective firms, private firms, mixed-ownership firms, foreign firms and Hong Kong, Macao and Taiwan firms. It also provides information such as industry affiliation, year of establishment, employment, value added, exports and fixed assets. These sources are valuable for us to match a treated firm with its similar control counterparts

by applying the propensity matching mechanism.

Foreign acquisition is defined as where the foreign share exceeds 25%. The choice of 25% as the threshold for defining acquisition is because the NBS defines foreign equity joint affiliates as firms in which 25% or more equity shares are held by foreign multinationals.

Table 3-2 below summarises how we construct variables for our analysis by using information from the data set. The outcome variable of interest for exporters prior to the acquisition is export intensity, which is measured as the share of exports to the total sales. The outcome variable of interest for non-exporters before foreign acquisition is the export dummy variable, which takes 1 if it exports and 0 if not. Dummy variable D^{acq} takes the value 1 if a foreign acquisition takes place, while it takes the value 0 if foreign share remains below 25%. Firm size is measured by the logarithm of number of employees in the firm. Firm capital intensity is the logarithm of the total fixed assets scaled by the total number of employees. The operating age of the firm is defined as the difference between the year of observation and the year of the firm's establishment. Firm labour quality is measured by the ratio of the firm wages to the number of employees. Finally, productivity is measured by total factor productivity (TFP). TFP is obtained from the method developed by Olley and Pakes (1996), in which the labour and capital elasticity are estimated for each 2-digit industry.

Table 3-2: Definition of Variables

Variable	Definition
D^{acq}	Dummy that takes the value 1 if foreign share reaches 25% and 0 if foreign share remains less than 25%
Firm leverage ratio	The total debt relative to the total assets
Firm liquidity ratio	The liquid assets relative to the total assets
Firm productivity	Total factor productivity (TFP)
Firm export intensity	Ratio of firm exports to total sales
Firm employment	Number of firm employees
Firm K/L Ratio	Ratio of firm fixed assets to number of employees
Firm age	Length of firm operating years
Industry capital dummy	Dummy takes 1 if industry capital intensity is higher than median and 0 otherwise
Industry R&D dummy	Dummy takes 1 if industry R&D intensity is higher than median and 0 otherwise
Regional foreign presence	Ratio of foreign sales to total sales of an industry in a region
Regional average wage	Ratio of industrial real wages in a region to the number of employees in the industry and region
Regional Institution quality	Regional intellectual property rights protection
Year	Yearly time dummy
Industry	2-digit industry
Province	31 provinces and regions within mainland China

Source: China Annual Survey of Industrial Enterprises

4.2 Descriptive statistics

Table 3-3 illustrates the number of foreign-acquired existing exporters and non-exporters from 2000 to 2005, using the whole sample. Our sample records 736,834 firm-year observations during the six years. The number of observations is smaller than the total number of observations in the full data set for three reasons. First, our estimation requires lagged variables in the probit estimation. Then, we also exclude firms with less than three observations consecutively, given the need to have data during the pre- and post-ownership change period. Thus, our working sample consists of all firms with at least three time series observations and that either remained in domestic ownership between 2000 and 2005 or started as domestic-owned enterprises and ended up in the hands of foreign investors. Finally, we also exclude those firms with more than two ownership changes between domestic and foreign.

Table 3-3: Frequency of Acquired Exporters v.s. Non-exporters

Year	Acquired exporters		Acquired non-exporters		Total	Whole sample
	Frequency	Percentage	Frequency	Percentage	Frequency	Frequency
2001	854	58.57%	604	41.43%	1,458	134,799
2002	1,069	58.64%	754	41.36%	1,823	156,227
2003	815	54.12%	691	45.88%	1,506	170,617
2004	1,713	51.55%	1,610	48.45%	3,323	141,814
2005	1,131	62.52%	678	37.48%	1,809	133,377
	5,582	56.28%	4,337	43.72%	9,919	736,834

Table 3-3 shows that the sample contains a similar number of firms in each year in total which is about 13,000-15,000 firms except that there are more than 170,000

firms in 2003. The total number of foreign-acquired firms is 9,919. In most years, the number of foreign-acquired firms is less than 2,000; however, we observe a drastic increase in 2004, in which 3,323 domestic firms are acquired by foreign investors. Furthermore, we find that acquired exporters are more than acquired non-exporters, with a relatively small margin. Among those foreign-acquired firms, more than 40% are non-exporters, for each year except 2005 in which we find that 37.48% of foreign-acquired firms are non-exporters.

Therefore, a fact that we can generate from Table 3-3 is that multinational firms may be more attracted by exporting indigenous enterprises in China. However, this trend is not overwhelming, a result which is contrary to our expectation. According to the discussions in the current literature, firm exporting experience has a major effect on exporting decisions. If foreign acquirers are export-oriented in China, as commonly supposed, we may expect the number of acquired exporters to be much higher than acquired non-exporters. Thus, in this study, one primary question is to investigate whether foreign acquisition promotes export in both scenarios.

Before we start any regression analysis, we examine who those acquired exporters and non-exporters are. Are they different in respect to firm, industry and location characteristics?

Table 3-4 provides the summary statistics of the key firm level variables. In general, we find evidence of 'cherry-picking'. Foreign-acquired firms are better financed, more productive, larger, more capital-intensive and younger on average. Furthermore, acquired exporters are better firms compared to acquired non-exporters

in terms of financial status, productivity, size and age. Interestingly, we find that acquired non-exporters are 33% more capital-intensive than acquired exporters. As the mean is calculated from the whole sample, we do not know whether within-industry or across-industry heterogeneity generates this difference. If across- industry heterogeneity plays a role, the evidence implies that acquired exporters in China are clustered in labour-intensive industries; this is consistent with existing empirical findings, showing that China is an export hub of labour-intensive products.

Table 3-4: Summary Statistics of Firm Level Variables

Variable	Whole sample		Total acquisition		Acquired exporter		Acquired non-exporter	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Leverage Ratio (t-1)	0.6096	(0.3396)	0.5412	(0.2774)	0.5386	(0.2745)	0.5447	(0.2812)
TFP (t-1)	4.2384	(1.2052)	4.4564	(1.1465)	4.5449	(1.1164)	4.3362	(1.1757)
Log Employment (t-1)	4.9864	(1.1527)	5.1862	(1.1114)	5.4437	(1.1053)	4.8543	(1.0283)
Log K/L (t-1)	-0.7279	(1.2583)	-0.3342	(1.2295)	-0.3896	(1.2071)	-0.2629	(1.2543)
Age	22.8125	(131.0175)	12.9977	(95.9869)	11.1435	(70.9732)	15.3841	(120.7515)

Table 3-5 (below) shows the number of foreign acquisitions by 2-digit industries. Although foreign acquisition occurs in almost all industries except tobacco, the frequency of foreign acquisitions varies significantly across industries. We find that export-led industries in China such as textiles, apparel, plastics and electrical machinery have more cases of foreign acquisition than other industries. In our sample, textiles, apparel, plastics and electrical machinery have more than 600 cases of foreign acquisition and over 2% industrial intensity of foreign acquisition.[6] This may imply that many acquisitions and FDI in China may be export-motivated. Without conditioning on the proportion of exporters in industries, it is hard to quantify the tendency to acquire exporter or non-exporter firms. However, at least it shows that in export-led industries, more foreign-acquired firms are existing exporters rather than non-exporters; and it is consistent with the assumption that foreign acquisitions are export-orientated, because exporting experience has a huge impact on exporting decisions and there are more exporting firms than non-exporting firms in these industries.

[6] It is calculated as the proportion of foreign acquisitions to the total number of domestic firms in an industry.

Table 3-5: Foreign Acquisition by Industry and Mode

Industry	ID	Acquisitions	Acquired exporter	Acquired non-exporter	Intensity of Acquisition (%)[a]
Mining and quarrying	08 -11	62	26	36	0.27
Processing of food	13	385	176	209	1.27
Manufacture of food	14	280	103	177	2.21
Manufacture of beverages	15	168	33	135	1.73
Manufacture of tobacco products	16	0	0	0	0
Manufacture of textiles	17	843	538	305	1.92
Manufacture of wearing apparel	18	878	648	230	4.22
Tanning & dressing of leather	19	433	339	94	3.95
Manufacture of wood	20	163	87	76	1.84
Manufacture of furniture	21	168	122	46	3.57
Manufacture of pulp paper	22	246	78	168	1.38
Publishing & printing	23	162	52	110	1.31
Manufacture of sports goods, toy and stationery.	24	284	231	53	4.81
Manufacture of coke & refined petroleum	25	40	10	30	0.93
Manufacture of chemicals & products	26	546	256	290	1.43
Manufacture of pharmaceutical goods	27	204	55	149	1.80
Manufacture of man-made fibres	28	57	24	33	1.94
Manufacture of rubber products	29	152	100	52	2.59

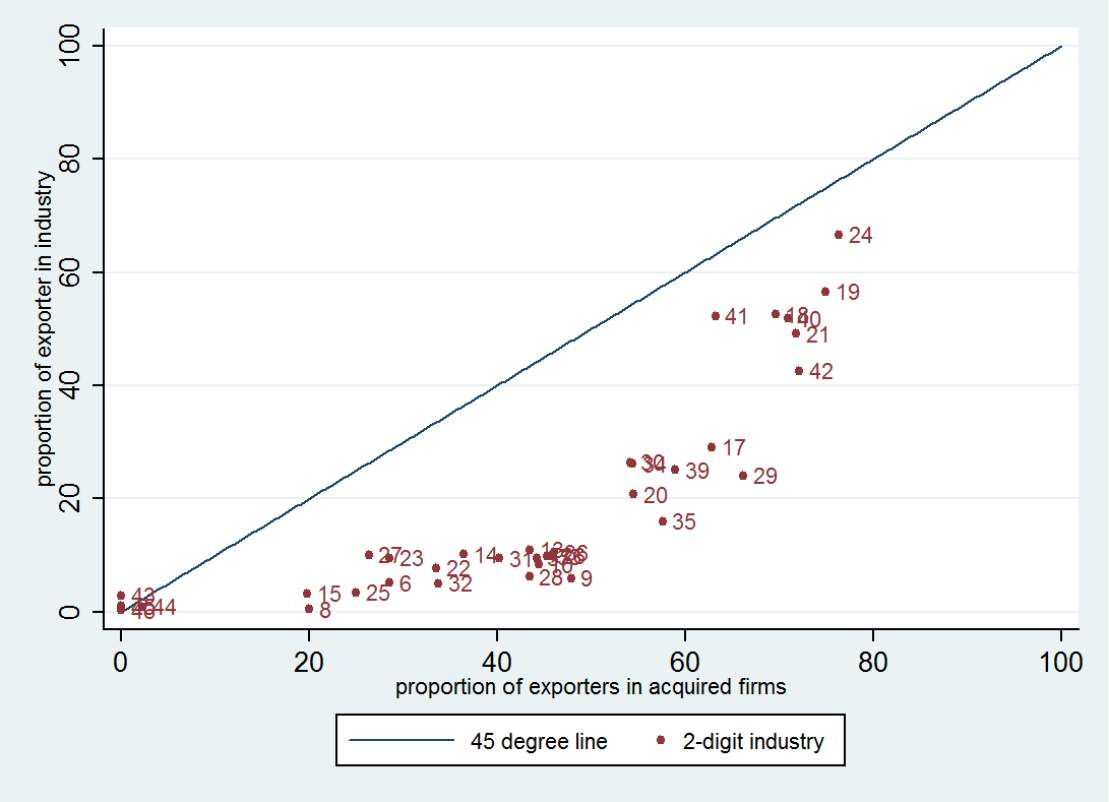
Note. [a] Intensity of acquisition is the proportion of acquisitions with the total number of domestic firms in an industry.

Table 3-5: Foreign Acquisition by Industry and Mode (Continued)

Industry	ID	Total Acquisitions	Acquired exporter	Acquired non-exporter	Intensity of Acquisition(%)[a]
Manufacture of plastic products	30	633	350	283	2.77
Manufacture of other non-metallic minerals	31	448	183	265	0.96
Manufacture of basic metals	32	86	29	57	0.68
Manufacture of non-ferrous metals	33	111	51	60	1.22
Manufacture of other metals	34	572	328	244	2.08
Manufacture of general purpose machinery & equipment	35	480	282	198	1.47
Manufacture of special purpose machinery	36	284	134	150	1.68
Manufacture of transport equipment and products	37	363	166	197	1.61
Manufacture of electrical machinery	39	607	365	242	2.19
Manufacture of communications equipment & computers	40	623	453	170	5.04
Manufacture of medical & optical instruments	41	185	121	64	3.23
Manufacture of crafts	42	313	240	73	2.97
Recycling	43	11	0	11	3.19
Electricity, gas and water	44 -46	132	2	130	0.48
Total		**9,919**	**5,582**	**4,337**	**1.89**

A significant amount of foreign acquisition still takes place in less export-intensive industries (i.e. where export intensity is less than 15%), such as beverages, pharmaceutical goods, refined petroleum and electricity, gas and water. In these industries, we observe that more non-exporters are foreign-acquired than exporters. Without controlling for the proportion of exporters in these industries, it is hard to define the tendency to acquire exporters or non-exporters. In fact, if the difference reflects a tendency towards acquiring non-exporters in less export-intensive industries, the market orientation of the foreign acquisition could be domestic sales. However, if the difference is caused by the fact that there are fewer exporting firms than non-exporting firms in these industries, the above argument may be incorrect. Therefore, in Figure 3-1, we describe the tendency of foreign investors to acquire exporters in each industry.

Figure 3-1: The Tendency of Foreign Acquisition on Exporting Firms across Industries



In Figure 3-1, the distribution of industries along the vertical axis shows that cross-industry differences exist for the proportion of exporters in industries. We observe that more than 50 percent of firms are exporters in the manufacture of sports goods, toys (24), wearing apparel (18), dressing of leather (19) and communication equipment and computers (40). Furthermore, we find fewer than 5 percent of exporters in industries such as mining and quarrying (8), and electricity, gas and water (44-46). Apart from these outliers, most industries have a proportion of exporters below 40% and above 10%.

The horizontal axis in Figure 3-1 shows the distribution of acquired exporters among all acquired firms for each industry. Looking at the proportion of exporters in acquired firms only, the distribution also shows huge cross-industry differences. For

industry such as sports goods, toys (24), wearing apparel (18), dressing of leather (19) and crafts (42), we find more than 75 percent of acquired firms were exporters before acquisition. In contrast, in some industries such as recycling (43), electricity, gas and water (44-46), none of the acquired firms exported before acquisition. However, such cross-industry differences could be driven by the proportion of exporters in industries. For example, in an industry which has a high proportion of exporters to start with, acquired firms are naturally more likely to be existing exporters. We could examine this argument by looking at the relationship between the two distributions.

In Figure 3-1, industries lie below the 45-degree diagonal, meaning that foreign firms have a tendency to acquire existing exporters across all industries, conditional on the proportion of exporters in an industry. The Figure 3-1 may imply that foreign acquisitions in China are export-orientated and may promote foreign sales after the take-over. There is no sign that, even in less export-intensive industries, foreign acquisition may be more likely to target non-exporting firms for promoting domestic sales in China.

The further away from the 45-degree diagonal, the higher the tendency for foreign investors to acquire existing exporters, taking into account the likelihood of exporters in the industry. We find that in more export-intensive industries such as apparel (18), leather (19) and toy (24), the tendency is stronger than in less export-intensive industries such as refined petroleum (25), publishing, and printing (23). This may also demonstrate that foreign acquisition in China is export-orientated. As we know, the industry that is less export-intensive is probably because of higher

exporting barriers. Export-oriented multinationals are more willing to acquire existing exporting plants. Thus, we expect in these industries a higher tendency to acquire existing exporting plants on the part of export-orientated foreign investors.

To summarize from Figure 3-1, acquisition FDI in China tends to acquire exporting firms across all industries. Furthermore, in less export-intensive sectors, this tendency is even stronger. Therefore, it is evident that foreign acquisition FDI is export-orientated from the industry dimension. We find no clear evidence showing that foreign acquisition may be motivated by access to domestic markets.

Having described the motives of foreign acquisition in China with industry dimensions from the data, Table 3-6 (below) shows the number of foreign acquisitions by exporters or non-exporters by geographic area. It shows that foreign acquisition in China has a clear geographic variance. More than 85% of foreign acquisitions have taken place in coastal regions such as Shanghai, Jiangsu, and Guangdong. The regional intensity of acquisition is also high in these coastal regions; furthermore, we observe that more acquired firms are exporters than non-exporters. These coastal regions are also known as fertile grounds for exporting in China because of the easy access to international markets. As a result, exporting firms are more clustered in these provinces. Only less than 15% of foreign acquisitions happen in inland regions, and without easy access to exporting in hilly inland regions, there are also fewer exporting firms, so we find that more acquired firms are non-exporting firms. In general, the geographic difference may also imply that acquisition FDI in China is export-orientated. Thus, foreign acquisition promotes export.

Table 3-6: Foreign Acquisition by Location

Province	ID	Total acquisition	Acquired exporter	Acquired non-exporter	Intensity of Acquisition (%)[a]
Coast Rg.					
Guangdong	44	2800	2,022	778	4.04
Shanghai	31	2022	1,072	950	8.99
Jiangsu	32	1147	620	527	1.69
Fujian	35	731	422	309	2.69
Zhejiang	33	647	453	194	0.92
Shandong	37	604	299	305	1.49
Liaoning	21	288	139	149	1.57
Tianjin	12	262	142	120	2.24
Guangxi	45	75	34	41	0.93
Hainan	46	21	4	17	1.19
Sub total		8597	5207	3390	
Inland Rg.					
Beijing	11	227	74	153	1.61
Hubei	42	173	66	107	0.70
Hebei	13	124	35	89	0.77
Henan	41	122	37	85	0.44
Sichuan	51	106	27	79	0.53
Hunan	43	105	29	76	0.65
Jiangxi	36	74	13	61	0.82
Anhui	34	66	27	39	0.57
Jilin	22	58	13	45	0.92
Heilongjiang	23	43	4	39	0.66
Chongqing	50	39	13	26	0.53
Shaanxi	61	38	8	30	0.46
Yunnan	53	37	5	32	0.56
Shanxi	14	27	7	20	0.26
Inner Mongolia	15	25	6	19	0.46
Guizhou	52	18	1	17	0.32
Xinjiang	65	14	4	10	0.34
Gansu	62	10	0	10	0.17
Ningxia	64	7	4	3	0.47
Qinghai	63	5	1	4	0.41
Tibet	54	4	1	3	0.50
Sub total		1322	375	947	
Total		**9,919**	**5,582**	**4,337**	**1.89**

Note. [a] Intensity of acquisition is the proportion of acquisitions with the total number of domestic firms in a province.

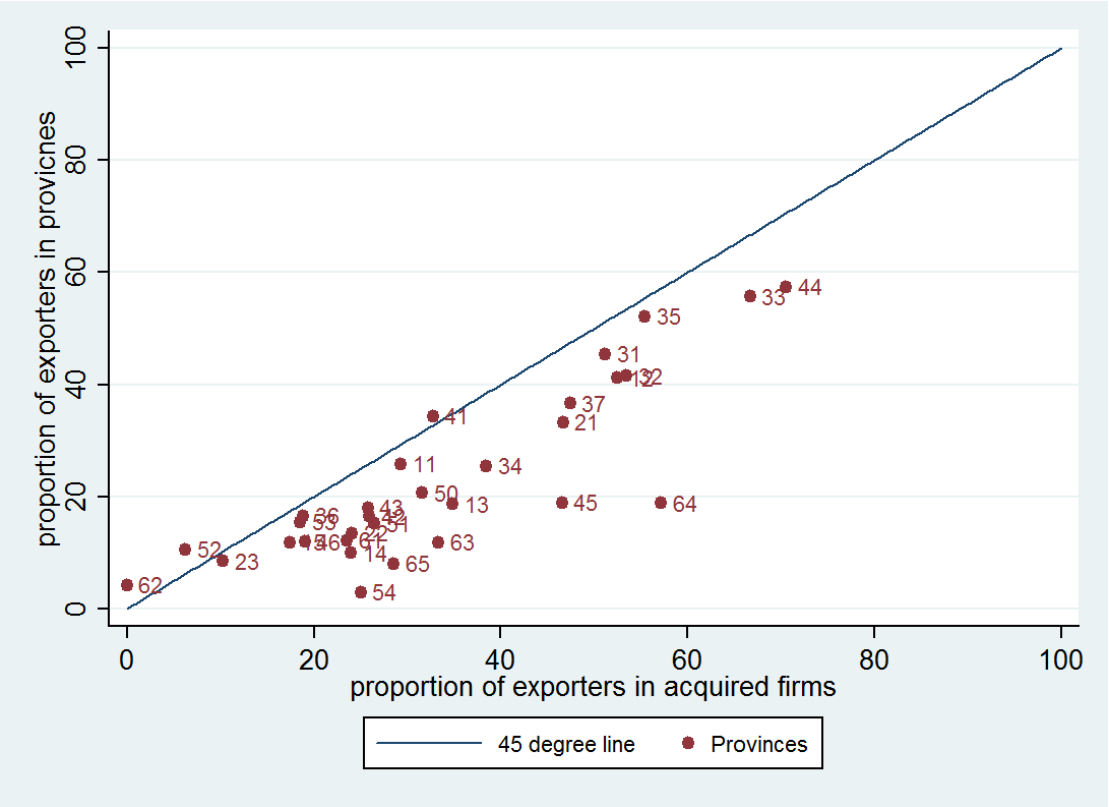
Although we find more acquired exporters in coastal provinces and more acquired non-exporters in inland regions, we are not able to conclude that foreign multinationals tend to acquire exporters in coastal regions for the convenience to export without controlling for the proportion of exporters across regions. In Figure 3-2, the vertical axis shows that cross province differences exist in the proportion of exporters. The further away from the horizontal axis implies that there is a higher percentage of exporting firms in the province relative to the total number of firms. In fact, we observe that more than a half of the firms in coastal regions such as Guangdong (44), Zhejiang (33) and Fujian (35) are exporters. Other coastal regions also have around 40 percent firms are exporting such as Shanghai (31), Jiangsu (32), and Shandong (37). Provinces in inland regions such as Tibet (54), Gansu (62) and Xinjiang (65) only have less than 10 percent exporting firms relative to total number of firms in the region. Most other inland provinces have less than 20 percent of exporting firms which is significantly less compared to coastal regions.

The horizontal axis presents the proportion of exporters in the total number of foreign acquired domestic firms cross province. The further away from the vertical axis implies that a higher proportion of foreign acquired is exporters in each province. Figure 3-2 shows that the proportion of exporters in acquired firms is larger in coastal provinces than inland provinces in general. For example, we observe around 70 percent foreign acquired firms in Guangdong (44) and Zhejiang (33). Proportions of foreign acquired exporters in inland provinces are below 20 percent in general.

To investigate the relationship between the two distributions, we draw a

45-degree diagonal. In Figure 3-2, most provinces are positioned under the 45-degree diagonal, except Gansu (62) and Guizhou (52). The implication is that acquisition FDI in China tends to acquire existing exporters in almost provinces even in inland regions. Furthermore, giving barriers to export is higher in inland regions, we find that this tendency is stronger in inland regions. To conclude, Figure 3-2 provides another piece of evidence that foreign acquisition in China is export-orientated.

Figure 3-2: The Tendency of Foreign Acquisition on Exporting Firms across Provinces



5 Empirical results

5.1 Propensity-score matching

5.1.1 The probit estimate with marginal effect

Before using the propensity-score matching method, we split the sample into exporters and non-exporters. As previously stated, the acquired exporters were defined as foreign-acquired firms that were exporters one year before the acquisition. The acquired non-exporters were foreign-acquired firms that reported zero exports one year before the acquisition. Next, we run probit models to investigate how domestic exporting firms or non-exporting firms were chosen by foreign multinationals. In our analysis, the probabilities of receiving treatment of both samples were estimated by a probit model with marginal effects. We regress a zero/one acquisition dummy on a set of lagged firm-level, industry-level and regional-level foreign acquisition determinants. At the firm-level, finance constraints of Chinese companies were also included. Year, industry and province dummies have been used to control for time-, sector- and regional specific fixed effects.

The leverage ratio is the total debt relative to the total assets: it indicates firms' long-term ability to repay their debt. The liquidity ratio is the liquid assets relative to the total assets: it indicates firms' short-term liquidity to finance their debt. In line with the literature, other firm variables are export intensity for the study of exporting firms, export dummy for the study of export likelihood, sales, size, TFP, capital labour ratio and firm operating age. Furthermore, industry-level variables include dummy variables which indicate whether the firm belongs to the categories of

capital-intensive industries and R&D-intensive industries. The regional-level variables are regional average wage, institution quality (property right measure), and the regional foreign presence measure included to control for the agglomeration effect of foreign firms.

Results for the foreign acquisition determinants for exporting firms are reported in Table 3-7. As shown in the table, the results for the firm-level determinants can be interpreted as domestic firms that have lower leverage ratio, higher export intensity, capital-intensive and younger are more attractive to foreign investors. The short-term ability to repay debt, production scale, size and productivity all shown to have no impact on the probability of foreign acquisition.

From Models 2 to 4, we added more dummies to provide controls for the time-, region-, and industry-specific effects. We found that significances of these variables remained across all these models. Notably, we noticed that the marginal effect of the firm leverage ratio on the probability of foreign acquisition on exporting firms was -0.202 in Model 4. This implies that a one standard deviation reduction in the firm's leverage rate raises the propensity of attracting foreign acquisition by two percentage points. Compared to other firm level factors, it is the most influential factor that contributes to the overall probability of being foreign acquired.

At the industry and region level, we concluded that firms which belong to the more capital-intensive industries, which locate in a region with higher foreign presence, and which have a higher average wage and better institutions are more likely to be foreign acquired. The coefficients for R&D were significant and negative

in the first three models, meaning that multinationals are more likely to acquire firms in the industries which require low R&D investment. However, it became insignificant when we controlled for industry fixed effects by introducing industry dummies.

Table 3-7: Determinants of Foreign Acquisitions for Exporting Firms

	Dependent Variable: D^{acq} For all acquired exporters=1 & domestic = 0			
	Probit model with marginal effects (dprobit)			
	(1)	(2)	(3)	(4)
Firm leverage ratio	-0.261***	-0.257***	-0.199***	-0.202***
	(-8.49)	(-8.37)	(-6.52)	(-6.61)
Firm liquidity ratio	0.00000797	0.00000134	-0.00000838	-0.00000617
	(0.10)	(0.02)	(-0.08)	(-0.06)
Firm export volume	0.0528***	0.0511***	0.0615***	0.0587***
	(8.54)	(8.16)	(9.30)	(8.80)
Firm sales	0.0258**	0.0211	0.0114	0.0147
	(2.03)	(1.63)	(0.86)	(0.99)
Firm employment	0.0202*	0.0231***	0.00791	-0.0000766
	(1.90)	(2.15)	(0.74)	(-0.01)
Firm TFP	-0.0108	0.000167	-0.00438	0.000365
	(-1.25)	(0.02)	(-0.49)	(0.03)
Firm K/L Ratio	0.0719***	0.0770***	0.0724***	0.0737***
	(9.26)	(9.81)	(9.29)	(9.01)
Firm age	-0.0171***	-0.0168***	-0.0182***	-0.0178***
	(-15.66)	(-15.55)	(-16.52)	(-15.93)
Firm age^2	0.00000835***	0.00000822***	0.00000895***	0.00000875***
	(15.31)	(15.21)	(16.23)	(15.65)
Indu. K-intensity	0.0265	0.0271	0.0159	0.0535***
	(1.46)	(1.48)	(0.85)	(2.60)
Indu. R&D	-0.0790***	-0.0868***	-0.0449***	-0.0135
	(-4.68)	(-5.08)	(-2.53)	(-0.29)
Region. foreign presence	0.146***	0.155***	0.0841***	0.0680***
	(17.39)	(18.14)	(10.14)	(7.86)
Region. average wage	0.241***	0.284***	0.181***	0.192***
	(8.58)	(10.09)	(6.40)	(6.65)
Region. institutions	0.0975***	0.0978***	0.320***	0.316***
	(7.75)	(7.29)	(9.19)	(9.05)
Year dummy	No	Yes	Yes	Yes
Region dummy	No	No	Yes	Yes
Industry dummy	No	No	No	Yes
_cons	-2.625***	-2.644***	-2.599***	-7.396***
	(-30.07)	(-29.95)	(-19.40)	(-12.26)
N	100080	100080	99927	99889

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Independent variables are logged except export share and all dummies. All independent variables are lagged by one year.

Results for the foreign acquisition determinants for non-exporters are reported in Table 3-8. We first found that the firm-level determinants had similar effects compared to those found for acquired exporting firms. Furthermore, we found that production scale and firm size also had positive and significant impacts on the likelihood that non-exporting firms would be acquired by foreign investors. The regional impact also turned out to be similar. However, the industry capital intensity and R&D impacts on the probability of foreign acquisition were different from the exporting firms: the results show that industry capital intensity had no significant impact on the likelihood of foreign acquisition. Moreover, by controlling for year, region and industry-specific factors that may affect foreign acquisition, such as preferential FDI policy which encourage foreign investment in certain industries, we found that industry R&D intensity had a positive impact on the probability that a non-exporting firm would be foreign acquired. Finally, we found that the marginal effect of firm leverage ratio was -0.156 in Model 4 which was smaller than -0.202 in Table 3-8. However, compared to other firm-level variables, it was still the most influential factor determining the probability that a domestic non-exporting firm would be acquired by a multinational.

Table 3-8 Determinants of Foreign Acquisitions for Non-exporting Firms

	Dependent Variable: D^{acq} For all acquired non-exporters=1 & domestic = 0			
	(1)	(2)	(3)	(4)
Firm leverage ratio	-0.202***	-0.194***	-0.168***	-0.156***
	(-7.07)	(-6.81)	(-5.88)	(-5.43)
Firm liquidity ratio	0.0000314	0.0000326	0.0000258	0.0000221
	(0.66)	(0.66)	(0.46)	(0.36)
Firm sales	0.0935***	0.0975***	0.105***	0.110***
	(8.44)	(8.70)	(9.33)	(8.59)
Firm employment	0.0658***	0.0625***	0.0583***	0.0437***
	(6.29)	(5.93)	(5.50)	(3.85)
Firm TFP	-0.00614	-0.00339	-0.0116	-0.00595
	(-0.75)	(-0.40)	(-1.40)	(-0.57)
Firm K/L Ratio	0.118***	0.119***	0.119***	0.119***
	(15.66)	(15.66)	(15.74)	(14.73)
Firm age	-0.0197***	-0.0191***	-0.0195***	-0.0190***
	(-19.07)	(-18.77)	(-19.10)	(-18.72)
Firm age^2	0.00000979***	0.00000951***	0.00000969***	0.00000944***
	(19.04)	(18.75)	(19.06)	(18.70)
Indu. K-intensity	0.000230	-0.00454	-0.000525	0.0266
	(0.01)	(-0.28)	(-0.03)	(1.37)
Indu. R&D	-0.0562***	-0.0614***	-0.0293*	0.127**
	(-3.65)	(-3.96)	(-1.82)	(2.70)
Region. foreign presence	0.124***	0.128***	0.0870***	0.0717***
	(17.21)	(17.86)	(11.89)	(9.58)
Region. average wage	0.169***	0.197***	0.0960***	0.0855***
	(8.85)	(10.66)	(4.62)	(4.02)
Region. institutions	0.0764***	0.0643***	0.191***	0.196***
	(8.10)	(6.75)	(6.67)	(6.85)
Year dummy	No	Yes	Yes	Yes
Region dummy	No	No	Yes	Yes
Industry dummy	No	No	No	Yes
_cons	-3.283***	-3.544***	-3.606***	-3.094***
	(-42.54)	(-44.38)	(-32.58)	(-6.61)
N	328233	328233	328233	328142

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Independent variables are logged except export share and all dummies. All independent variables are lagged by one year.

5.1.2 The result of propensity-score matching for acquired exporter firms and acquired non-exporter firms

Using the propensity score obtained from the probit estimation, we matched foreign-acquired exporting/non-exporting firms with remaining exporting/ non-exporting firms within the same year. The results of the balancing tests were shown in Table 3-10.

Taking into account all foreign acquisition determinants mentioned above, we then matched acquired firms with similar domestic firms by using the nearest neighbour propensity-score matching method with non-replacement by year for each sample. For each firm that had undergone ownership change, a domestic firm that was 'closest' to it in terms of its propensity score was selected as a match using the 'caliper' matching method. Since lagged variables are included in the matching probit, matching was done for all years except the initial year 2000.

Table 3-9 gives the frequency distribution of firms by year and treatment status for exporters. The first two columns give the frequency of acquired exporting firms and the number of domestic firms by year in the whole sample: there were 5,589 foreign-acquired exporting firms in the sample, which was about 1% of the total number of firms. Furthermore, the frequency of the acquired exporters remained stable across years except for 2004 in which 1,781 exporting firms were foreign-acquired. The number of observations pertaining to firms that have never been acquired in the sample is 539,832. The last two columns in Table 3-9 present the number of acquired exporting firms and matched non-acquired domestic firms. Using

propensity-score matching by year, only 4,155 domestic firms were recognised as successful matches for those acquired firms; in other words, 4,155 domestic firms were found to have observable similar characteristics to those acquired firms.

Table 3-9: Frequency of Acquired Exporters by Year: Whole sample vs. Matched Sample

	Unmatched sample		Matched sample	
Year	Treated	Control	Treated	Control
2001	853	86,041	621	621
2002	1,028	114,257	786	786
2003	806	117,109	594	595
2004	1,781	115,384	1,364	1,364
2005	1,121	107,041	791	789
Total	5,589	539,832	4,156	4,155

In Table 3-10, we report the mean of firm-level determinants between the treated and non-treated groups one year before the acquisition and test the differences, for the sample where acquired firms are exporters. In the first two columns, we report the results for the unmatched sample. Notably, we found that acquired exporters were on average more export-intensive than domestic firms; they were also better financed, larger, more productive, more capital-intensive and younger. Most results were consistent with the probit estimation. The next two columns report the results of the matched sample. We found that the differences some important firm-level variables were substantially reduced by the matching procedure. By checking the balancing tests year by year, we successfully constructed a group of unmatched firms which could be further included in the control group. We carried out balancing tests for each year and we show our results for 2001 in the last two columns of Table 3-10. Note that the lower the standardised differences, the more balanced or similar the

treatments and comparison groups. In this paper, we follow the work of Rosenbaum and Rubin (1983) which suggests that the value of 20 of the standardised differences (shown as % bias in Table 3-10) as the threshold for a significant difference. We also report the t-test between acquired and matched comparisons. Overall, we found that balancing conditions were satisfied for key variables.

Table 3-10: Mean and Standard deviation for some Variables of Interest: Whole Sample vs. Matched Sample one year Pre-acquired Exporters

	Unmatched sample		Matched sample		PS-test 2001	
Variables	Control	Acquired	Control	Acquired	%bias	p>|t|
Firm leverage ratio	0.6200	0.5379	0.5671	0.5377	20.0	0.111
Firm exports	9.2393	9.7130	9.7277	9.8649	7.9	0.560
Firm sales	9.8187	10.5776	10.6090	10.6205	13.9	0.307
Firm employment	4.9727	5.4465	5.5582	5.4940	-0.3	0.983
Firm TFP	4.1621	4.5409	4.5423	4.5365	13.6	0.325
Firm K/L Ratio	-0.7389	-0.3277	-0.4171	-0.3619	-8.1	0.564
Firm age	23.8865	11.2886	14.6782	9.8615	-3.2	0.235

Table 3-11: Frequency of Acquired Non-exporters by Year: Whole Sample vs. Matched Sample

	Unmatched sample		Matched sample	
Year	Treated	Control	Treated	Control
2001	601	86,041	423	423
2002	752	114,257	562	562
2003	693	117,109	502	502
2004	1,600	115,384	1,308	1,308
2005	678	107,041	478	477
Total	4,324	539,832	3,272	3,273

Table 3-11 shows the frequency distribution of firms by year and treatment status for acquired non-exporters and domestic firms. We found 4,324 acquired non-exporting firms. The last column shows that 3,273 domestic firms were found as

good matches for those acquired non-exporting firms. We report the mean of and differences in firm-level determinants between the treated and non-treated groups one year before the acquisition in Table 3-12. We found that results in the unmatched sample (first two columns) were also consistent with findings in the probit estimation: non-exporters that were targeted by foreign buyers had lower debt ratio, were more capital-intensive and were younger. The differences in size, productivity and production scale between the two types of firms were relatively small. The next two columns show the results from the matched sample: clearly, the differences in the firm level variables were significantly reduced as a result of the propensity-matching. Again, checking balancing tests year by year, we successfully expanded the matched sample. The balancing test for 2001 is shown in the last two columns.

Table 3-12: Mean and Standard Deviation for some Variables of Interest: Whole Sample vs. Matched Sample one year Pre-acquired Non-exporters

	Unmatched sample		Matched sample		PS-test 2001	
Variables	Control	Acquired	Control	Acquired	%bias	p>|t|
Firm leverage ratio	0.6200	0.5444	0.5690	0.5434	-4.9	0.796
Firm sales	9.8187	10.2944	10.1401	10.3166	8.5	0.678
Firm employment	4.9727	4.8605	4.8550	4.8619	18.4	0.371
Firm TFP	4.1621	4.3052	4.2449	4.3067	3.1	0.883
Firm K/L Ratio	-0.7389	-0.2096	-0.3975	-0.2507	-29.0	0.155
Firm age	23.8865	15.0202	16.4091	14.1274	6.5	0.765

5.2 The effect of foreign acquisition on exporting in China

We now turn to the results from the DiD estimates on the matched firms. Working with acquired exporters and non-exporters, we investigated how foreign acquisition had an effect on export likelihood and export intensity in China by

implementing propensity-score matching and difference-in-difference estimation. The propensity-score matching allows us to construct a group of firms that are similar to acquired firms but have never actually been acquired. Then we are able to reveal the effects of an acquisition on exporting by comparing two groups of otherwise very similar firms. The DiD estimator is able to eliminate common effects on both the treatment group of firms and the control group of firms that are contemporaneous with the acquisition. For example, economic policy change, market demand change or input cost change affect both the acquired firm and the otherwise similar non-acquired firm in a similar fashion. Thus, the combination of PSM-DiD estimates ensure explanatory variables used in the matching and aggregate shocks that might affect acquisition impacts on export likelihood or export intensity were not relevant in our estimation.

Table 3-13 gives the OLS estimates from our DiD results for two acquisition scenarios. In the first scenario, we investigate the foreign acquisition effect on export likelihood of acquired non-exporting firms. In the second scenario, we examine the effect of foreign acquisition on export intensity of acquired exporting firms. Rather than showing the DiD results by year, we estimate the accumulated foreign acquisition impact on export likelihood and export intensity for different periods after foreign acquisition.

In Table 3-12, we first investigated whether foreign-acquired non-exporters became more likely to export or not. The first outcome variable is the export dummy which indicates exporting status. The first set of results in the table proved that

foreign-acquired non-exporting firms are more likely to start exporting after the acquisition compared to those similar firms that remain domestic. Quantitatively, the size of the effect was significant and considerable. According to the PSM-DID estimation, foreign acquisition increased the accumulated impact on the probability of exporting in the year of acquisition by 14.1 percentage point, followed by 14.2 percentage point in a two years period, 16.4 percentage point in a three years period and 17.5 percentage point in a four years period, compared to those similar firms that have never been acquired. In the previous descriptive analysis, although we find more than 40 percent of foreign acquired firms are non-exporters before acquisition, they are more likelihood to appear in exporting industries or coastal regions. Therefore, we raise a hypothesis that foreign acquisition in China has a positive effect on export decision if acquired firms were non-exporting before the acquisition. Our first set of results in Table 3-13 provides evidence to support our hypothesis that foreign acquisitions in China increased the export likelihood of acquired non-exporting firms.

The results for the effects of foreign acquisition on exporting firms are shown in the lower rows of Table 3-13. The outcome variable of the second set is exporting intensity which is measured as the ratio of exports over sales. The results indicate that foreign-acquired exporting domestic firms will further enhance export intensity, and that this impact is positive right after the foreign acquisition. The effect is quantitatively large. As shown in Table 3-13, foreign acquisition promotes the accumulated export intensity by 5 percentage points in a three year period after acquisition. Overall, in a four year period after foreign acquisition, acquired firms are

5.5 percentages more export intensive than the controlled firms that have never been foreign acquired. These results accord with what the literature suggests as we discussed earlier: previous exporting experience has a major effect on current exporting and can explain 90 percent of exporting behaviour. Furthermore, we find foreign acquirers in China are more likely to be clustered in exporting industries and regions. Therefore, it is expected that they are more likely to be export-orientated. Our results strength the argument by providing evidence that acquisition FDI in China stimulates export intensity of the acquired exporting plant.

To conclude from the two scenarios, acquisition FDI in China has a high tendency to engage in export. This is independent of the exporting status of the acquired firms prior to the acquisition. We find the export intensity increases if foreign acquisition FDI inflows invest in existing exporting firms. Even for those acquired firms that were non-exporters, we find a significant positive boost on the likelihood of exporting due to foreign acquisition. Our results are consistent with our descriptive analysis in which we find acquisition FDI is more likely to appear in exporting industries or regions. Our results are in line with the statement that that acquisition FDI inflows in China is widely considered as export-orientated.

Table 3-13: The Accumulated Effect of Foreign Acquisition: Export Perspective

Outcome variable (Y)	Years after foreign acquisition	Difference In Difference	*t* statistics	Number of observations
Sample of Non-exporters				
Export Dummy	One year	0.1406***	15.80	11036
	Two years	0.1421***	13.28	9696
	Three years	0.1642***	9.73	7061
	Four years	0.1753***	6.43	6233
Sample of Exporters				
Export intensity	One year	0.0234*	1.84	13983
	Two years	0.0261*	1.85	11851
	Three years	0.0490***	3.27	9124
	Four years	0.0552***	2.10	8148

Note: *t* statistics in parentheses* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5.3 Sources of effects of foreign acquisition on exporting

The next question is why does foreign acquisition stimulate exports? Or in other words, which factors could explain the fact that foreign acquisitions cause changes that lead to an increase in exports by Chinese manufacturing firms? To answer this question, we first consider factors that may have an impact on exporting, i.e. the determinants of exporting. In the literature, firm performance and financial constraints are widely considered the most important factors in affecting exporting.

5.3.1 Whether effects of foreign acquisition on export are caused by a productivity boost?

Having discussed that firm's exporting decisions are affected by the productivity level in the literature, we then first discuss whether the increase in exports due to foreign acquisition is induced by the increase in productivity trigged by foreign

acquisition. In Table 3-14, we use PSM-DID estimates to investigate whether foreign acquisition has effects on productivity of acquired firms. The outcome variable in Table 3-14 is the productivity which is measured by total factor productivity (TFP).

The first set of results indicate whether the productivity is changed in the foreign acquired non-exporting firms compared to the controlled non-exporting firms that remain domestic. Although, we found that the PSM-DID estimates were in general positive after foreign acquisition, we did not observe any significant accumulated productivity growth caused by foreign acquisition. In the second set of results, we show whether foreign acquisition affected productivity of exporting firms. Similar to the findings for the acquired non-exporting firms, we find evidence that foreign acquisition neither immediately boosted productivity nor had an accumulated impact on productivity in a medium term.

To summarize from the two scenarios in Table 3-14, we find acquisition FDI in China had no significant impact on firm productivity, thus acquisition FDI may not focus on developing technology and skills of the host country. In other words, although export-motivated FDI inflows are widely considered as having the potential to stimulate the exports of host countries by transferring technology or upgrading technical and managerial skills, it is apparently not the case in the Chinese manufacturing sector during this period.

As mentioned in the literature review, many studies investigate the inter-firm effects of foreign acquisition by looking at FDI from developed countries which invest in a developing economy. They are found to be highly productive, technology

advanced and efficiently managed. Thus, a positive productivity spillover is often found in the literature. Our approach is different in that our focus is on intra-firm consequences of FDI. There are two facts that imply no productivity increase due to foreign acquisition.

There are two reasons that explain why we do not observe FDI-induced productivity gain. First, according to China Ministry of Commerce report (2003), FDI inflows in China during our sample period are mainly from Hong Kong and Taiwan, which account for 60 percent of cumulated FDI inflows in China. FDI projects from countries with significant superior technology than China such as U.S. and U.K. only account for 8.79 percent and 0.81 percent respectively. Second, most acquisition are clustered in labour-intensive industries as we described before. So to the extent that acquisition is all about finance the acquired firm, it is possible that acquisition FDI that exploits cheap labour does not help enhance productivity.

Finally, since we do not observe any significant change in TFP due to foreign acquisition in Table 3-14, we can conclude that the effect of foreign acquisition on the export decision is not channelled via productivity gain.

Table 3-14: The Accumulated Effect of Foreign Acquisition: Productivity Perspective

Outcome Variable (Y)	Years after foreign acquisition	Difference In Difference	*t* statistics	Number of Observations
Sample of Non-exporters				
Log of TFP	One year	-.0121	-0.26	11036
	Two years	-.0783	-1.52	9696
	Three years	-.0381	-0.55	7061
	Four years	.0515	0.57	6233
Sample of Exporters				
Log of TFP	One year	.0528	1.38	13983
	Two years	.0359	0.86	11851
	Three years	.0473	0.90	9124
	Four years	-.0125	-0.20	8148

Note *t* statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.3.2 Whether effects of foreign acquisition on export are caused by healthier financial condition?

In this part, we discuss whether increase in export likelihood or intensity due to foreign acquisition is possibly stimulated by the effect of foreign acquisition on the firm-level financial status. To answer this question, we first investigate whether foreign acquisition has an impact on the financial indicators of foreign acquired firms compared to similar domestic firms. In Table 3-15, we use PSM-DID estimates to investigate the accumulated impact of foreign acquisition on the long-term leverage ratio which is measured by the long term debt over the total assets and the short term liquidity ratio which is measured by the liquidity assets relative to the total assets. Two financial indicators are used as outcome variables in our investigation. The first outcome variable is the long term leverage ratio. The long term leverage ratio indicates firms' ability to raise long-term investment for production modification or

overseas marketing. The second outcome variable is the short-term liquidity ratio. We take it into account because Chaney (2005) shows that sufficient liquidity is required to finance the export entry cost if there is a random liquidity shock every period.

The first set of results in Table 3-15 report the results from comparing acquired non-exporters with non-exporters which remains domestic. We do not find evidence that foreign acquisition immediately increases short-term financial liquidity. In addition, it shows that foreign acquisition does not have an effect on productivity in the medium term. However, we observed a significant accumulated improvement in the long-term leverage ratio after two years of foreign acquisition. After three years of accumulation, we observed that the leverage ratio was reduced by 4.2%; after four years of accumulation, we identified that the leverage ratio fall by about 4.7%.

The lower rows of Table 3-15 show whether acquisition affects the financial indicators of exporting firms. Similar to the first scenario we have discussed, foreign acquisition does not have a significant effect on the short-term financial variable, i.e. the liquidity ratio. However, foreign acquisition has a statistically significant effect on the long-term leverage ratio two years after the acquisition. Quantitatively, relative to matched domestic firms, foreign acquisition reduces the long-term debt by 0.7% in the treatment year; then a bigger reduction of the long-term debt is found in two years, which is about 3%. The reduction accumulates to 3.7% in three years and 4.2% in four years.

To summarise, in Table 3-15, we observe foreign acquisition results in a healthier long-term financial status. The result provides supporting evidence about an issue

related to export-oriented FDI in China claimed in some previous studies such as Huang (2003) and Egger and Nelson (2011). They believe that because of financial discrimination from the state-dominated banking system, private enterprises in China have been forced to sell off their assets to foreign investors who possess large internal finance and better access to international capital market in order to realise their production potential.

The findings in Tables 3-14 and 3-15 combined are consistent with the argument on the negative aspects of foreign acquisition in China. First, we do not observe any significant increase in productivity in foreign acquired non-exporting firms. Thus, the result provides evidence for a popular debate concerning the argument that foreign acquisition may solely focus on local cheap labour and raw materials and therefore may not help to develop the host country's technology and skill level. Secondly, we find a significant and sizable reduction in the long-term debt ratio. Therefore, our results also imply that a rapid increase in foreign acquisitions in China may be attracted by China's deficient economy policy such as discriminative financial policy against private firms.

Table 3-15: The Accumulated Effect of Foreign Acquisition: Financial Constraint Perspective

Outcome Variable (Y)	Years after foreign acquisition	Difference In Difference	*t* statistics	Number of Observations
Sample of Non-exporters				
Long term Leverage ratio	One year	-.0076	-0.63	11036
	Two years	.0150	1.18	9696
	Three years	-.0418***	-2.56	7061
	Four years	-.0468***	-2.81	6233
Short term liquidity ratio	One year	-.0028	1.07	11036
	Two years	-.0013	0.49	9696
	Three years	.0050	0.02	7061
	Four years	-.0036	0.38	6233
Sample of Exporters				
Long term Leverage ratio	One year	-.0077	-0.77	13983
	Two years	-.0297***	-2.58	11851
	Three years	-.0371*	-1.64	9124
	Four years	-.0420***	-2.27	8148
Short term liquidity ratio	One year	-.0004	0.07	13983
	Two years	-.0001	0.14	11851
	Three years	-.0003	0.20	9124
	Four years	.0002	1.02	8148

Note *t* statistics in parentheses* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Having found that only long-term leverage ratios have been reduced due to foreign acquisition, we turn to investigate we examine whether the long-term leverage ratio has impact on the increase in export due to foreign acquisition. We include the leverage ratio into the PSM-DID regression as a control variable. If coefficients of the

PSM-DID estimate has considerable changes in size or even in direction when a control variable is introduced, it then tells us that the control variable and PSM-DID estimate have an endogeneity issue. In other words, the omission of the variable would cause an over-estimated or under-estimated DID coefficient. If this turns out to be the case, we can conclude that the effects of foreign acquisition on export are caused by the healthier financial condition due to foreign acquisition.

Based on the first part of Table 3-16, it was considered whether leverage ratio has an impact on the export likelihood after foreign acquisition by including long-term leverage ratio as a control variable into our PSM-DID analysis for the sample of acquired non-exporting firm and controlled firms that remain domestic. First, we observe that the PSM-DID estimates do no change compared to our benchmark results. The export likelihood increases due to foreign acquisition. Secondly, the direction of the change in export likelihood when leverage is introduced as a control variable is about the same in the period except the first year. In fact, in all four periods except the first, the coefficients of export likelihood estimates in Table 3-16 is smaller than the benchmark results in Table 3-13. Thus, the omission of long-term leverage caused an overestimation of the PSM-DID coefficient in our benchmark results. In another word, a part of the export increase can be explained by the reduction in firm's long-term debt. So, the increase in export likelihood due to foreign acquisition may be affected by a healthier financial condition after acquisition. Finally, we find that the change in size on the export likelihood coefficient is relatively negligible quantitatively. By comparing Table 3-16 with Table 3-13 and

looking at two years after foreign acquisition, we find the likelihood to export decreases from 0.1421 to 0.1412 which is about a 0.6 percent decrease when long-term debt ratio is controlled for. After accumulating by a four year period, the difference between two results remains very small which is about 1 percent. As a result, the size of the effect of the leverage ratio on the export effect of foreign acquisition is very limited.

In the second part of Table 3-16, the leverage ratio is included as a control variable into our PSM-DID analysis for the sample of acquired exporting firms. We also find that the coefficients of PSM-DID are smaller in almost all four periods than in the benchmark results, if the leverage ratio is added as a control variable. So again, the omitted variable causes an overestimation of the PSM-DID coefficient in the benchmark results in Table 3-13. It implies that the reduction in firm's long-term debt may explain a part of the export intensity increase due to foreign acquisition. However, the size of the impact is again negligible. By comparing the lower rows of Table 3-16 with Table 3-13, one year after foreign acquisition, we find the export intensity coefficient decreases from 0.0234 to 0.0228 (which is only about a 2.5 percent difference when long-term debt ratio is controlled). After accumulating by a four years period, the difference is only about 5 percent. So the size of the effect of leverage ratio on the export effect of foreign acquisition is very small.

In summary, we only identified positive effects of foreign acquisition on the likelihood of export and export intensity through the lowering of the long-term debts. Nevertheless, this effect is quantitatively small and negligible. Furthermore, because

we do not observe foreign acquisition to have any sizable and significant effect on productivity and the short-term liquidity ratio, we draw the conclusion that the increase in exports due to foreign acquisition is not related to productivity and short-term liquidity change. In other words, foreign acquisition are more likely to engage in export and are more export-intensive than remaining non-foreign-acquired firms, mostly due to unobservable factors which cannot be explained by productivity or financial conditions which are extensively discussed in the literature as determinants of exporting.

Table 3-16: The Accumulated Effect of Foreign Acquisition: Export Perspective Controlled by Long Term Leverage Ratio

Outcome Variable (Y)	Years after foreign acquisition	Difference In Difference	*t* statistics	Number of Observations
Sample of Non-exporters				
Export dummy	One year	.1415***	15.72	11036
Long term Leverage ratio		-.0176***	-2.78	
Export dummy	Two years	.1412***	13.23	9696
Long term Leverage ratio		-.0097	-1.23	
Export dummy	Three years	.1550***	9.69***	7061
Long term Leverage ratio		-.0147***	-2.24	
Export dummy	Four years	.1735***	6.40***	6233
Long term Leverage ratio		-.0146***	-2.26	
Sample of Exporters				
Export intensity	One year	.0228*	1.79	13983
Long term Leverage ratio		-.0373***	-3.07	
Export intensity	Two years	.0244*	1.73	11851
Long term Leverage ratio		-.0418***	-3.46	
Export intensity	Three years	.0524***	3.18	9124
Long term Leverage ratio		-.0365***	-3.02	
Export intensity	Four years	.0571**	1.96	8148
Long term Leverage ratio		-.0554***	-3.25	

Note *t* statistics in parentheses* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.3.3 Discussion of other possible firm-level effects of foreign acquisition on export increase.

A systematic discussion of other potential factors in the literature is limited. One potential factor of such unobservable factors is the buyer-seller relationship in international trade brought in by acquiring foreign firms. Recent literature suggests that international trade has become increasingly dependent on the transmission of complex information as traded goods involve a high degree of differentiation (Rauch, 1999) and production networks spread across the globe (Hummels *et al*., 2001). In fact, close communication between trade partners is more and more essential.[7] As foreign acquirers possess a wider network and better communication stand than local Chinese firms, foreign investors facilitate information sharing which is necessary for product re-design and for better matching of international markets' expectations.[8] As a result, foreign investors create business relationships in international markets after acquisition. Therefore, we observe foreign acquisition has a significant and positive impact on export intensity and the likelihood to export. Since we do not have data for measuring the export reliance on information possessed by foreign investors, we cannot provide empirical evidence to support the above hypothesis in this chapter.

Furthermore, as it is discussed in literature of privatisation, another potential candidate of unobservable factors is changes in firms' attitude toward profits and risks, which is particularly relevant if foreign acquired firms are Chinese state-owned firms.

[7] In a recent global survey of 2300 Harvard Business Review subscribers, respondents said that face-to-face meetings are key to building long-term relationship (95%), negotiating contracts (89%), meeting new clients (79%).

[8] IBM Global CEO Study (2006) reports survey evidence that business partners are the second most important source of innovation.

After foreign acquisition, former SOEs do not benefit from policy preference from the government anymore, so they may have to expand their business to survive. Given the convenience of exporting from the foreign acquirer, acquired SOEs are prompt to explore foreign markets. Also, foreign acquired SOEs become more risk-taking and may initiate exporting. Todo and Sato (2011) find that more risk-taking firms are more likely to export. Furthermore, risk preference's impact on exporting decisions is far more important than the productivity and firm size impact, evidenced by firm-level data for Japanese small and medium enterprises. Since we do not have data on firm's attitude toward profit and risks in China, we cannot test this hypothesis in this paper. However, these psychological factors need to be considered because it may also play an important role in the effect of foreign acquisition on exporting.

5.3.4 Whether the effect of foreign acquisition on export in China is related to industry characteristics?

As shown there is a clear industry dimension to exports in China, we investigate whether the effect of foreign acquisition on export increase in China is related to industry characteristics such as external financial dependence and R&D intensity. I construct the 2-digit industry-level financial dependence, R&D intensity, and export intensity dummies. The financial dependence is the 1986-1995 capital dependence in the U.S. at the 2-digit level. It is measured as the median external capital expenditure according to Rajan and Zingales (1998).[9] The dummy of the financial dependence

[9] It is measured as (capital expenditure-cash flow)/capital expenditure.

equals 1 if the industry's financial dependence that the firm belongs to is higher than the median level of industry financial dependence. The financial dependence is 0 otherwise. The R&D intensity is the U.S. 2 digit-level R&D intensity measured by Kroszner, Laever, and Klingebiel (2006). The R&D intensity dummy equals 1 if the industry's R&D intensity is higher than the median of industry R&D intensity. The R&D intensity is 0 otherwise. Finally, the industry export intensity dummy equals 1 if the industry's export intensity is higher than the median of industry level export intensity, and 0 otherwise.

Having constructed the three dummies, the financial dependence dummy, R&D intensity dummy and export intensity dummy variables are interacted with the treatment dummy. If the coefficient of the interaction term is statistically significant, it shows that financial dependence, R&D intensity or export intensity has an impact on the export increase due to foreign acquisition. The specification of the regression is described as follows:

$$Y_{it} = \beta_0 + \beta_1 acq_i + \beta_2 pacq_t + \beta_3 acq * pacq_{it} + \beta_4 acq * pacq_{it} * Adum_i + \beta_5 Adum_i + \beta_6 acq * Adum_i + \beta_7 pacq_{it} * Adum_i + \varepsilon_{it} \quad \text{(Eq.3-6)}$$

where Adum is the dummy variable representing financial dependence dummy, R&D intensity dummy or export intensity dummy

Table 3-17 shows whether the acquisition effect on export is different in high financially-dependent industries and low financially-dependent industries. β_3 can be

interpreted as the coefficient of PSM-DiD estimate if the financial dependence is low. Consistent with our previous findings, we observe an increase in export likelihood and intensity in low financial dependent industries. β_4 can be interpreted as the difference of PSM-DiD estimate between high financial dependence industries and low financial dependence industries. We find β_4 is insignificant in all periods for both sample of foreign acquired exporter and foreign acquired non-exporters. Thus the financial dependence has no impact on the effect of foreign acquisition on export in China.

Similarly, in Table 3-18, we find acquisition boosts exports in low R&D industries in general. However, we find it is not statistically different from the acquisition effect on export in high R&D industries. Therefore, we conclude that foreign acquisition has a positive effect on exports of acquired firms and this effect is not related to whether the acquired firm is highly externally financially-dependent or highly R&D intensive.

Table 3-17: The Effect of Acquisition on Export According to Industries with different External Finance Dependence

Outcome Variable (Y)	Dummy ($Adum_i$)	Years after foreign acquisition	DiD (β_3)	DiDiD (β_4)	Number of Observations
Sample of Non-exporters					
Export Dummy	Financial Dependence	One year	0.1283***	0.0083	11006
			(8.31)	(0.44)	
		Two years	0.1342***	-0.0165	9696
			(5.69)	(-0.71)	
		Three years	0.1777***	-0.0296	7026
			(5.83)	(-0.78)	
		Four years	0.1749***	-0.0014	6187
			(2.74)	(-0.03)	
Sample of Exporters					
Export intensity	Financial Dependence	One year	0.0377*	-0.0207	13973
			(1.75)	(-0.78)	
		Two years	0.0385*	-0.0011	11825
			(1.75)	(-0.04)	
		Three years	0.0331*	0.0084	9068
			(1.72)	(0.22)	
		Four years	0.0321*	0.0364	8148
			(1.81)	(0.77)	

Note *t* statistics in parentheses* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3-18: The Effect of Acquisition on Export according to Industries with different R&D

Outcome Variable (Y)	Dummy ($Adum_i$)	Years after foreign acquisition	DiD (β_3)	DiDiD (β_4)	Number of Observations
Sample of Non-exporters					
Export Dummy	R&D	One year	0.1380***	0.0053	11006
			(3.68)	(0.14)	
		Two years	0.1739***	-0.0574	9696
			(3.84)	(-1.23)	
		Three years	0.1925***	-0.0397	7026
			(2.55)	(-0.51)	
		Four years	0.2515***	-0.0840	6187
			(2.54)	(-0.82)	
Sample of Exporters					
Export intensity	R&D	One year	0.0288*	-0.0055	13973
			(1.80)	(-0.17)	
		Two years	0.0187*	0.0252	11825
			(1.75)	(0.67)	
		Three years	-0.0250	0.0739	9068
			(-1.56)	(1.52)	
		Four years	0.0278*	0.0324	8148
			(1.76)	(0.50)	

Note *t* statistics in parentheses* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6 Conclusions

Inward FDI has been viewed as an accelerator of host countries' economic growth. One of its major potential growth contributions is to promote host countries' exports. Our study empirically investigates this issue by using the Chinese data for all firms in the Chinese manufacturing industry with annual turnover of more than 5 million Chinese Yuan for the period 2000-2005, a period during which inward flows of FDI played an important role in Chinese exporting market. Our paper contributes to the literature mainly from five aspects. First, although there has been a large numbers

of studies investigating FDI and export linkage, most of them are based on aggregate region- and sector- level data. We employ a firm-level dataset with propensity-score matching and difference-in-difference techniques that eliminates the causal inference on the direct impact of FDI and unobservable time invariant effects, which are correlated with the selection. Second, we split our sample into foreign acquired exporting firms and non-exporting firms prior to acquisition. Therefore, export performance in this paper takes changes of both export intensity and export likelihood into account thoroughly. Third, in addition to discussing the acquisition effect on export, the paper is the first to consider factors could generate this effect with a firm-level analysis. Fourth, we also had a firm-level examination on whether the acquisition effect on export is associated with some industry characteristics. Fifth, the investigation on acquisition FDI related export, productivity, and financial constraint allows us to understanding on the role of FDI in a host country comprehensively. It is important from a policy perspective, especially for emerging countries.

By investigating acquired exporters and acquired non-exporters, we find that foreign acquisition increases the export intensity of the acquired existing exporter significantly. For example, in the second year after the acquisition, the export intensity of an acquired firm is about 5.5 percent higher than that of a similar firm that has never been acquired. We also find that the likelihood to export increased for acquired non-exporters, compared to similar firms remaining entirely in domestic control. We observe that this impact starts from the year that foreign acquisition takes place.

Regarding factors that may be related to this effect, we investigate whether the effect of foreign acquisition on exporting is driven by productivity upgrading or financial status improving. The DiD-PSM estimators indicate that productivity is not boosted by foreign investors to a statistically significant extent for either acquired exporters or acquired non-exporters. This is a striking result as many existing studies find positive productivity spillovers from FDI. However, it is not surprising, because existing studies focus on multinational firms from developed countries, while only a small proportion of FDI in China is sourced from developed countries. FDI from U.S., for instance, only account for 8.79 percent of cumulated FDI inflows in China by 2002. We observe a significant improvement in firm long-term leverage ratio for both types of firms. We also identify effects of acquisition FDI on the likelihood of export and export intensity through lowering long-term debts. However, this effect is quantitatively small and negligible. Finally, we also examine whether the acquisition related export-boost differs according to industry characteristics. We do not observe the acquisition effect is statistically different in high external finance dependent industries and low external finance dependent industries. It is also invariant across low R&D intensive industries and high R&D intensive industries.

To summarize, our empirical results suggest that foreign acquisition results in an increase in the exports of acquired firms. We also find that the increase in exporting due to acquisition FDI is not channelled by acquisition related productivity upgrading. From the financial constraint perspective, this effect may be caused by a healthier financial condition. The evidence is quantitatively very small though. Furthermore, as

our results show that export-orientated foreign acquisition results in a reduction in debt but no productivity increase, it is consistent with the concern about the negative aspects of FDI inflows. Policy implications are drawn for the integration of policies on FDI and financial market reform, especially for developing countries which attract export-orientated FDI. One direction of future research would be to investigate the buyer-seller relationships in international trade brought in by acquiring firms by employing both firm-level census data and firm-level trade data.

CHAPTER 4: Greenfield Investment versus Acquisition: the Location of Foreign Manufacturers in China

1 Introduction

In the light of the dramatic increase in Foreign Direct Investment (FDI) activities globally and its important role in the rapid economic growth of emerging countries in recent decades, the literature on the location determinants of FDI is quite substantial. Motivated by Dunning (1979, 2002)'s OLI paradigm and Markusen (1984, 2004)'s knowledge-capital model, many studies such as Markusen and Venables (1998) have investigated the location determinants of FDI with recognition of ownership choices. However, multinational enterprises (MNEs) undertaking FDI face another strategic decision; a choice between setting up a new plant (greenfield) or taking over an existing firm (acquisition). There are fewer studies on the relationship between these two modes of investment and the intrinsic characteristics of the host location. In this paper, we contribute to the literature by providing evidence that location determinants of inward FDI have different effects in terms of attracting greenfield FDI versus acquisition FDI with the use of Chinese micro-level data.

By definition, greenfield foreign investments are in the process of expanding operations overseas by building subsidiaries from ground-zero, while acquisition FDI is the purchase of already existing companies in a host location. As such, there are several reasons why location determinants are different depending on investment

modes. First, the key difference between the two modes of foreign investment relates to the origin of the resources to be employed in the foreign subsidiaries. Kogut and Singh (1988) suggest that greenfield FDI uses resources of the multinational investor itself, whereas acquisition FDI uses both the resources of the investor and the assets of the local firm. Indeed, greenfield projects start with no market share; it is financed externally by the investor; and it requires new employees. In contrast, acquisition FDI is able to use the existing resources of acquired firms such as customers, assets and employees. In the literature, empirical evidence has shown that host location's market size (Cleeve, 2008), financial sector development (Mohamed and Sidiropoulos, 2010), and labour market conditions (Vijayakumar *et al.,* 2010) are important determinants of the location choice of inward FDI in general. However, limited empirical studies have been down to assess whether the same variables would have different effects in attracting greenfield FDI versus acquisition FDI.

Another intrinsic difference between the two modes of FDI is that a high concentration of firms provides procurement opportunities which only apply to acquisition FDI. According to rather established literature on the agglomeration and FDI, the regional cluster of local firms plays an important role when MNEs make their investment location decision (Fujita *et al*., 2001). To localise where other firms present, FDI invested plants benefit from positive agglomeration economies in the form of a large pool of customers and suppliers, availability of intermediate goods and service, specialised manpower, knowledge spillover between close firms and so on. Foreign invested firms also face negative sides of agglomeration. A large number of

firms in a region also drive up costs because of the effect of competition on the product and labour market. Two sides of the effect of agglomeration can attract or deter FDI inflows depending on which force is the stronger. However, since a higher stock of local firms also implies more potential acquisition targets, Roberto (2004) suggests that agglomeration which is an important location determinant should have different effects on greenfield FDI versus acquisition FDI. Although a large amount of studies have focused on agglomeration and FDI in general, the empirical evidence on comparing greenfield and acquisition FDI with the use of economic geography theories is scarce. One study is Roberto (2004) which is based on FDI in Italy. It shows that agglomeration-related location externalities affect the two modes of FDI in different ways.

Following two streams of literature above, we are motivated to evaluate whether location characteristics have difference effects in attracting the two foreign investment modes, with a focus on the effects of agglomeration, market size, financial market development and labour market. To fulfil the purpose of this study, we employ a negative binomial model based on a comprehensive firm-level dataset covering the six-year period from 2000 to 2005 and 31 regions in China. With the use of Chinese firm-level data, we provide the first empirical evidence of its kind based on FDI in China.

There are several reasons why China is interesting for our investigation. First, China has become the world's second largest recipient of FDI (second only to the US) and the largest FDI recipient among developing countries since the early 1990s. After

China's accession to the WTO in 2001, there has been an even faster growth in FDI inflows. According to the database of UNCTAD's FDI/TNC, since 2000 China received larger FDI inflows than any other emerging economy. It reached a record US$ 108 billion in 2008 compared to US$ 70 billion in Russia and US$ 42 billion in India. It is a phenomenon in the world economy, which has attracted the attentions of numerous scholars.

Second, economic development and FDI activities have significant regional differences in China. China has its explicit economic policy bias across regions such as special economic zones (SEZs). Eastern coastal provinces, especially Shanghai and Guangdong, host most foreign investment due to their proximity to major ports, strong industrial base and regulation provision. However, less-developed regions, namely in Central and West China, draw significantly fewer FDI investments. Moreover, both greenfield FDI and acquisition FDI in China are highly active. Greenfield FDI dominated FDI inflows until the late 1990s. With the availability of more favourable regulatory provisions and more potential targets since China's WTO accession, foreign acquisition has become a major part of FDI inflows. So, the uneven distribution of FDI across regions and the common existence of both modes of FDI inflow make China a valuable case to investigate location determinants of FDI. In literature, there are few papers investigating the location determinants of FDI inflows in China such as Cheng and Kwan (2000). However, there has yet not a China-based study on the location determinants with emphasis on a comparison on greenfield FDI versus acquisition FDI.

Third, to investigate the location attractiveness of the two investment modes in China is also important from a policy perspective since greenfield FDI and acquisition FDI are expected having different consequences on the location economy. Although there has been no systematic investigation into the different consequences of greenfield FDI and foreign acquisitions in terms of aggregate investment and growth, respectively, investigations on the determinants of FDI suggest that multinationals who possess high technology and productivity prefer greenfield investment (Görg, 2000; Nocke and Yeaple, 2008). Their results may imply that host economy benefits more from greenfield FDI. Furthermore, policymakers have an ongoing FDI policy adjustment which encourages foreign investors to build plants in China's interior regions. Greenfield investments are particularly important in western regions in China where are not industrial bases, and thus have less attractiveness for acquisition FDI (for example: procurement opportunities). To allocate their limited recourses to attract greenfield foreign investors effectively, it is important that policymakers understand the location determinants of FDI respect to two modes of FDI entries. Our study provides an investigation on the location attractiveness to foreign investors and sheds light on FDI policy adjustment in China.

To summarise, our investigation contribute to the literature in three ways. First, we include greenfield and acquisition into the investigation on the location determinants of FDI inflows. Second, our research is the first of its kind based on inward FDI in China with use of a micro-level data. Third, we tackle the question by focusing on agglomeration economies along with other location determinants such as

financial market development.

The paper is structured as follows. Section 2 provides a literature overview. Section 3 presents our empirical strategy including the explanation of variables and hypothesis. Our data are described in Section 4. In Section 5, we first test the effect of location determinants on greenfield FDI and foreign acquisition separately. Then we make a direct comparison on the effects of location determinants in these two modes of foreign investments. Finally, we conclude on the main results in Section 6.

2 Literature review

The rapid growth in FDI activities over recent decades has led to substantial research into the phenomenon of multinational firms. A long list of determinants that attract FDI in a particular host location has been investigated in the literature. Rather than treat FDI projects as being homogenous in their investment strategies, many recent studies include the ownership decision in their framework. However, many existing studies are missing another important variation in the modes of FDI inflows, which are the investment modes, namely, greenfield FDI and acquisition FDI. In this section, we provide a review of the theory and empirical literature that discusses the location determinants of FDI, followed by a review of related studies on comparing location determinants of greenfield FDI versus acquisition FDI.

2.1 Theoretical approach to location determinants of FDI

Theoretical approaches on foreign firms' location choice assume that

multinational investors seek a location which gives the highest expected returns. Each firm faces a maximising problem based on the profit function: $\pi_i = \pi_i(X_i)$, where X_i is a vector of the characteristics of the region *i*. Over the past few decades, we have witnessed a growth of FDI theories that explain X_i in different ways. The first explanations on the determinants of FDI were base on the neo-classical trade theories. In their framework, vector X_i comprises measures of labour costs according to Ricardian theory and accessibility to production factors such as raw materials referred in the Heckscher-Ohlin model (1933) and the MacDougall-Kemp model (1964). They suggest that lower labour cost and cheaper raw materials in host countries motivate inward FDI.

Since the neo-classical approach, there has been an expansion of theoretical approaches on FDI determinants in many aspects. For example, Hymer (1976)'s market imperfection suggests that the cost of acquiring local knowledge is an important factor for FDI decisions. Later, Dunning (1979, 2003) contributed to the literature by bringing together several complementary theories of FDI. He provides an integrated framework on the determinants of FDI, namely, the eclectic or OLI paradigm. It suggests that ownership (O), location (L) and internalisation (I) are simultaneously affecting multinationals' investing strategies. Location attractiveness in its framework is explained as preferential tax policy, lower transport costs and production costs, and larger market size. Dunning and Lundan (2008) further developed the vector X_i in the OLI paradigm by introducing market risk as an important location determinant of foreign investments. The development of the new

trade theory (Krugman, 1980) provides a rigorous theory foundation to explain the relationship between the three elements of the OLI paradigm. The location determinants of FDI that are based on the new trade theory focus on market potential, transaction costs and factor endowments.

New trade theory contributed to the rise of new economic geography in the early 1990s.[1] It emphasised the importance of branch plant location in economic growth. Base on a rather established literature, Fujita *et al*. (2001) suggests that industrial firms tend to localise where manufacturing plants are clustered because of agglomeration externalities such as easier access to intermediate goods, product services, skilled labour and knowledge spillover. New economic geography shed light on investigations on location determinants of FDI inflows from an agglomeration effects perspective. Several empirical studies have investigated this theory such as Roberto *et al*. (2004) and Hilber and Voicu (2010). Also, to extend the new economic geography approach with a general equilibrium heterogeneous firm mode based on Melitz and Ottaviano (2005), Falvey *et al*. (2007) shows that, given parent's firm's productivity, a foreign-owned firm will be less likely to survive if the market size is smaller.

Finally, as we discussed in Chapter 2, institutional quality has been recognised as an important factor in FDI inflows. Weak institutions result in poor legal protection of assets making foreign investment less likely. Higher corruption may increase the cost of FDI projects. Furthermore, political instability increases the likelihood of failure of

[1] Please refer to Krugman (1991).

foreign investments.

2.2 Empirical evidence on location determinants of FDI

The development of theory on the FDI location decision has been accompanied by a fast growth of empirical studies. Based on the early literature and the OLI paradigm, production costs, infrastructure, economic development and preferential policy have been tested as location determinants of FDI inflows in many empirical investigations.

By employing a multivariate regression on FDI inflows in 80 less-developed countries, Schneider and Frey (1985) show that foreign investors prefer countries with lower labour costs. Mohamed and Sidiropoulos (2010) found that infrastructure quality is positively associated with FDI in MENA countries. They also revealed that financial sector development encourages FDI inflows. Preferential policy has also been shown to be an important factor of FDI growth. Intuitively, higher taxes push FDI away from the host location. By investigating 25 empirical studies on taxation and FDI, Mooij and Ederveen (2003) find that the median tax rate elasticity in the literature is -3.3, indicating that a 1 percent increase in the host location tax rate reduces FDI inflows by 3.3 percent. Based on the FDI in 29 Chinese provinces from 1985 to 1995, Cheng and Kwan (2000) show that special economic zones (SEZs) attract more foreign investment, indicating preferential policy of the host location is important in attracting FDI inflows.

Along with the rise of the new trade theory, many empirical studies have focused

on how market size and the openness of the host economy affect the growth of foreign investments. In many cross-country investigations such as Asiedu (2006) and Mhlanga *et al.* (2010), market size (GDP) has been found to have a positive effect on attracting FDI inflows. Cheng and Kwan (2000) show that provinces in China with larger per capita income are more favourable FDI destinations. Furthermore, Mhlanga *et al.* (2010) also show that market growth encourages foreign investments in developing countries in South Africa.

The weight of trade in GDP is usually used as a proxy for the openness of an economy in many studies. As explained in Chapter 3, many foreign investments are export-oriented. Thus, higher openness of a host location attracts greater FDI inflows. Both Mhlanga *et al.* (2010) and Asiedu (2006) provided evidence to support this argument by investigating FDI in developing countries.

There is also a less established empirical literature motivated by the new economics geography theory. Figueiredo *et al.* (2000) focus on the agglomeration effects on spatial choices of greenfield foreign plants in Portugal. In their study, agglomeration is measured by the size of the industry-specific employment. They conclude that the size of manufacturing employment is an import location determinant of greenfield FDI. Furthermore, they find that total employment in the service sectors such as business and financial sector plays a role in attracting manufacturing FDI. More recently, Hiber and Voicu (2010) find similar evidence in Romania with the same measurement of agglomeration. Other empirical studies such as Roberto *et al.* (2008) measure the agglomeration directly with the number of firms of a sector in a

region of E.U. countries. They find a positive and significant effect of the number of local firms on the number of foreign entries in 50 regions of 8 E.U. countries. They also show that FDI inflows are driven by the number of foreign establishments in the region.

2.3 Location determinants of greenfield FDI and acquisition FDI

Multinationals face two decisions when they undertake investment in foreign countries, namely, choice of ownership mode and of investment mode. The decision on ownership mode depends on the choice of a partially owned venture or a wholly owned affiliate, while the decision on investment mode depends on the choice of greenfield investment or acquisition investment. There are a fair number of studies on the location determinants of FDI inflows with consideration of ownership variation such as the OLI paradigm. However, fewer investigations have focused on how location characteristics have different effects on attracting greenfield FDI versus acquisition FDI.

Based on the OLI paradigm and new trade theory approach, Neto *et al*. (2010a) investigate the determinants of greenfield FDI and acquisition FDI with an analysis of panel data of 53 countries over the period 1996 to 2006. They show that market size, openness of economy, institution quality, and human capital are common in attracting two different modes of foreign investments. Risk measurements such as property protection and cultural differences play an important role in the location decisions of greenfield FDI versus acquisition FDI. They explain that greenfield investments are

intrinsically more risky than acquisitions.

In order to evaluate how difference in technologies, investment costs, market size and market competition affect FDI entries, Thomas Müller (2007) develops a multi-stage game by endogenizing the acquisition price and the profits. The sub-game perfect equilibrium solved by backwards induction shows that greenfield investment is the optimal choice when the markets are very competitive or very uncompetitive.

From the preferential policy perspective, Hebous *et al.* (2010) examine how different taxation policies explain the location decision of two FDI investment modes by employing German outbound FDI data with logit estimates. They find that the location decision of greenfield investments is more sensitive to different tax rates than that of acquisition FDI. They explain that a higher tax rate can be capitalised by a lower acquisition price, while this effect is absent in the case of greenfield investment.

According to established FDI literature based on the new economic geography theory, Roberto (2004) seeks to assess how agglomeration has different effects on the location decisions of foreign greenfield entries versus acquisition FDI inflows in 95 Italian regions from 1986 to 1999. They found that the number of established firms encouraged acquisition FDI but had no significant effect on greenfield investment. They pointed out that agglomeration might have both positive externalities attracting FDI inflows and negative congestion-like competition effects diverting FDI inflows. However, higher numbers of firms also provide more potential acquisition targets. This positive procurement effect does not exist in the case of greenfield investment. Furthermore, it found that greenfield FDI is affected more by the number of foreign

incumbents. Recognising a cluster of foreign incumbents is a sign of a good investment environment for foreign investors; the result implies greenfield investment is more reliant on this signal. It is consistent with the result in Neto *et al.* (2010a), which suggests that greenfield investment is riskier than acquisitions.

Overall, there is a large literature on the location determinants of FDI inflows. Some studies have addressed some determinants that have different effects on attracting greenfield FDI versus acquisition FDI. Inspired by this literature, our research is particularly focused on agglomeration effects, as well as some other regional effects on attracting the two modes of FDI across 30 regions in China. To the best of our knowledge, we provide the first empirical evidence of its kind for China.

3 Methodology

3.1 Empirical strategy

In this section, we present our empirical strategy and econometric specification. Following some existing empirical literature such as Roberto (2004), we employ a negative binomial model to estimate the impact of different location determinants on greenfield FDI versus acquisition FDI. Therefore, the dependent variable (FI) is the number of foreign acquired firms or newly established foreign firms at province-industry-time level. In the count model, the standard model is the Poisson regression model. However, the negative binomial model, which explicitly models over-dispersion, is a more flexible function form for over-dispersed count data. In our research, we implement a random-effect, negative binomial estimation for two

reasons. First, we find that the variance of the explanatory variable exceeds the mean. It implies that there is over-dispersion so that the Poisson model is not appropriate according to Winkelman (2008). Secondly, we have a large number of zero observations. In addition, following the suggestion in Winkelman (2008), the negative binomial model is better suited to accommodate excess zeros compared by the Poisson model.

Independent variables are mainly six different location characteristics that may have different effects on the two modes of foreign investments. They are demand-side agglomeration (Agg_demand), number of firms (Agg_firm), stock of foreign firms (Agg_FDI), wage variation (Wage_CV), government efficiency (BU) and financial development (FinD). We also add an industry level control (Hfd ∗FinD), which is the sector financial dependence dummy interacting with the regional financial development into our later discussion. In order to avoid simultaneity issues, we assume that the location decisions of FDI are based on provincial characteristics of previous year. So all explanatory variables are lagged for one year and expressed in logs. Combing in the main provincial variables with other control variables, our benchmark estimation equation is as follows:

$$FI_{i,s,t} = \beta_1 Agg\_demand_{i,s,t-1} + \beta_2 Agg\_firm_{i,s,t-1} + \beta_3 Agg\_FDI_{i,s,t-1} + \beta_4 Wage\_CV_{i,s,t-1} + \beta_5 BU_{i,t-1} + \beta_6 FinD_{i,t-1} + \beta_7 Hfd * FinD_{i,s,t-1} + \varphi + \varepsilon_{i,s,t} \quad \text{(Eq.4-1)}$$

where subscripts *i*, *s* and *t* stand for each province *i*, sector *s* and each period of time *t*. The dependent variable $FI_{i,s,t}$ is count data that is assumed to be discrete and non-negative integer values. φ represents year-, 2-digit sector or province dummies to control for time, industry and region fixed effects. $\varepsilon_{i,s,t}$ is the error term. In general, we expect greenfield FDI or acquisition FDI to be positively related to the demand-side agglomeration, the number of foreign incumbents and financial market development, but negatively dependent on wage variation and bureaucracy. Since the agglomeration effect from a cluster of firms of an industry in a province may have both positive externalities and negative competition congestions, we are interested in finding the direction of the effect for both investment modes.

To extend our discussion, we compare whether location characteristics have different impacts on the two modes of foreign investments. We regress the ratio of the number of foreign greenfield plants over foreign acquisitions on location determinants. The specification is shown as follows:

$$\frac{FI_{green}}{FI_{acq}}_{i,s,t} = \beta_1 Agg\_demand_{i,s,t-1} + \beta_2 Agg\_firm_{i,s,t-1} + \beta_3 Agg\_FDI_{i,s,t-1} + \beta_4 Wage\_CV_{i,s,t-1} + \beta_5 BU_{i,t-1} + \beta_6 FinD_{i,t-1} + \varphi + \varepsilon_{i,s,t} \quad \text{(Eq.4-2)}$$

Furthermore, we have a check on our benchmark empirical strategy with consideration of location proximity to other provinces into agglomeration variables[2]. How we construct the explanatory variables and extend our hypotheses is specified in

[2] There are the demand-side agglomeration, the number of incumbents and the number of foreign incumbents.

the following sub-section.

3.2 Determinants of location decisions: independent variables

Explanatory variables that have impacts on location decisions of greenfield FDI versus acquisition FDI are derived from the existing literature discussed in the previous section. First, we mainly focus on the form of agglomeration economies that attract foreign investments towards concentrated economic centres and the agglomeration diseconomies that push some foreign investments away from groups of competitive firms. Second, we are interested in whether the condition of the labour market is relevant on attracting the two modes of foreign firms. Third, we introduce provincial bureaucracy to investigate whether better government efficiency is appealing to different foreign invested firms. Finally, from the external finance perspective, we examine how provincial financial market development has effects on attracting greenfield FDI versus acquisition FDI.

We measure agglomeration effects in three ways. First, we consider 'demand-side' agglomeration rent, which refers to the advantage of being close to a large market. Krugman (1991) suggests that it is preferable to locate in a country or region, which has a large market. Therefore, we expect that demand-side agglomeration is positively correlated with FDI inflows. In our research, the benchmark specification of the demand-side agglomeration $Agg\_demand_{i,s,t}$ is measured by the $Y_{i,s,t}$, which is the output level of an industry *s* within the province

i.[3] In fact, the provincial demand-side agglomeration of an industry is much wider than the potential market of the province itself. Many theoretical works of economic geography, such as Fujita (1988), have applied space into agglomeration and focused on linkages of 'proximity markets', which stand for markets where the distances between buying and selling are short. Therefore, we extend our bench market specification with a more general consideration by taking account the spatial agglomeration.

According to a precursor framework by Harris (1954) s' market-potential function, the market potential of a location equates the potential demand for goods and services produced in the same sector within a location and the location's proximity to all other consumer markets (locations). In other words, the market potential accounts for both the size of market itself and its position relative to other markets. Recent researches such as Roberto (2004) and Roberto *et al.* (2008) derive a gravity-adjusted specification based on Harris (1954). In this paper, we follow the specification applied in Roberto (2004). Unlike the squared distances used in Roberto (2004), we use unit distances between locations, which deflate fewer effects of proximate markets by distances. A reason for this change is that distances between capital cities of Chinese provinces are much bigger than in the case of Italy. Thus, the unit distance between capital cities in China is a sufficient deflator for the location's proximity to all other markets. Therefore, in order to calculate the general demand-side agglomeration rent of a sector *s* within a province *i* ($Agg\_demand2_{i,s,t}$),

[3] In China, provinces are 'land-locked' as the trade barriers between provinces are high. With assumption that most outputs are consumed within the province, we use industry production as a proxy to measure demand of a province.

we calculate the average, inversely distance-weighted province-sector-year level outputs in all China province from 2000 to 2005 based on our firm-level dataset. It is shown as the following equation:

$$\text{Agg\_demand2}_{i,s,t} = Y_{i,s,t} + \sum_{j \neq i} \frac{Y_{j,s,t}}{\text{dist}_{ij}} \quad \text{(Eq.4-3)}$$

where $Y_{i,s,t}$ is the output of an industry *s* within the province *i*, $Y_{j,s,t}$ is the output of a sector *s* in each province *j*. It is weighted by dist_{ij}, which is the distance between two capital cities of two provinces. Distances are measured by the number of kilometres and calculated from Google map. Generally, the expression shows that the larger a province's own output, the closer to other larger markets and the larger other provinces' output, the higher the province's market potential of an industry.

In the second measure of agglomeration effect, we take the cluster of firms of the same sector in a province into account. In theory, manufacturing plants tend to locate where many other firms operate according to a typical cumulative causation approach, first envisaged by Myrdal (1957). As we discussed, a cluster of firms provide a large pool of stable suppliers and customers. It also increases the supply of skilled labour and generates more knowledge spillover between firms in the same industry. On the other hand, it also refers to the congestion-like competition effect from a high concentration of firms. Indeed, firms face both a highly competitive product market and labour market where a large number of similar firms operate on. Therefore, the competition effect acts as a centrifugal force that pushes foreign investors away from

the highly competitive market to less congested provinces. Although the two forces have effects on the two modes of FDI inflows, a large number of firms also supply higher procurement opportunities that may have a positive effect in the case of acquisition FDI. It is difficult to disentangle the effect of procurement opportunities from the effect of agglomeration externalities. However, we expect the number of local incumbents to have different effects in attracting greenfield FDI versus acquisition FDI if the procurement opportunity effect is large. To evaluate the agglomeration effect of a sector *s* within a province *i* ($\text{Agg\_firm}_{i,s,t}$) generated by number of existing firms, we consider the number of firms in the same industry per squared kilometer in each province in China from 2000 to 2005.

$$\text{Agg\_firm}_{i,s,t} = \frac{N_{i,s,t}}{A_i} \quad \text{(Eq.4-4)}$$

where $N_{i,s,t}$ is the stock of firms in the industry *s* in the province *i* at a particular year *t*. A_i is the area of the province in squared kilometers. $\text{Agg\_firm}_{i,s,t}$ indicates the concentration of relative firms in the province *i*.

According to spatial agglomeration theory, the agglomeration effect may also come from its proximities to all other provinces. Therefore, we also extend our specification into a broader consideration as we have done for the variable of demand-side agglomeration. With consideration of province's relative position to all other provinces, we construct:

$$\text{Agg\_firm2}_{i,s,t} = \frac{N_{i,s,t}}{A_i} + \sum_{j \neq i} \frac{\frac{N_{j,s,t}}{A_j}}{\text{dist}_{ij}} \quad \text{(Eq.4-5)}$$

The third measure of agglomeration is not the generic number of established domestic firms but only the number of foreign invested incumbents existing in the same industry within a province. The agglomeration economies of this form are connected to the disclosure of information and investment risk reduction. It is intuitive that foreign investors have limited knowledge about the host location's investment environment. It is costly for them to observe the advantages and drawbacks of location choices because of factors such as cultural and language differences. The difficulty of acquiring local knowledge can curb multinationals' investment into the location. However, a higher FDI stock can be treated as a signal of the location being 'foreign friendly'. Given that greenfield investments are generally a riskier mode of investment compared to the acquisitions as mentioned in the literature, we expect greenfield FDI is more dependent on the stock of foreign plants. The variables of the stock of FDI $\text{AGG\_FDI}_{i,s,t}$ and $\text{AGG\_FDI2}_{i,s,t}$ are constructed in the same way as we constructed the stock of firms of an industry in a province above. The only change is $NF_{i,s,t}$ is the number of foreign plants of the same industry within a province, as follows:

$$\text{Agg\_FDI}_{i,s,t} = \frac{NF_{i,s,t}}{A_i} \quad \text{(Eq.4-6)}$$

and

$$\text{Agg\_FDI2}_{i,s,t} = \frac{\text{NF}_{i,s,t}}{\text{A}_i} + \sum_{j \neq i} \frac{\frac{\text{NF}_{j,s,t}}{\text{A}_j}}{\text{dist}_{ij}} \quad \text{(Eq.4-7)}$$

Apart from agglomeration measurements, there are other provincial variables that we are interested in. First of all, we proximate the condition of the labour market $\text{Wage\_CV}_{i,s,t}$ by using the coefficient of variation of wages of an industry within a province from 2000 to 2005. It is defined as the ratio of the standard deviation σ to the average wage μ of the wage in each 2-digit level industry at each province. A lower coefficient of variation of wage in an industry means less variation relative to the average wage of an industry. It may imply a more competitive labour supply of an industry in a province. By assuming sufficient labour mobility, China with a population of 1.3 billion offers abundant labour supply across regions. Therefore, a more competitive labour supply implies a possible lower labour cost of the industry in a region, which encourages FDI inflows. However, one important drawback of this argument is that we do not have information about the quality of the labour. Therefore, the variation may not only come from the competitiveness of the labour market but also from different skills or education levels of the labour in an industry.

$$\text{Wage\_CV}_{i,s,t} = \frac{\sigma_{\text{wage},i,s,t}}{\mu_{\text{wage},i,s,t}} \quad \text{(Eq.4-8)}$$

Intuitively, it is believed that the competitiveness of the labour market has asymmetric effects on attracting the two modes of foreign investments. Greenfield FDI is probably more affected by the labour market because they create new jobs and

hire employees from labour market, while acquired firms may not be affected because they take over the assets of acquired firms as well as labour forces.

Then, we use bureaucracy (BU) to measure government efficiency. It is widely accepted in the recent literature such as Bénassy-Quéré *et al*. (2007) that the quality of domestic institutions is a key determinant of FDI inflows. We believe it is of special interest in the case of China. Although 'optimal size' of the government in a market economy, either at central or local level, may be controversial in theory, it is widely accepted that China has a massive and bureaucratic government. Registration regulations and approval procedures are complicated. Furthermore, communicating with government officials is a heavy burden even in daily operations for managers, especially foreign ones because of language and culture difference. We expect both greenfield FDI and acquisition FDI are negatively related to the provincial bureaucracy. Ideally, the most relevant bureaucracy data to reflect the difficulty of establishing a new foreign invested business are those that concern project permission, licensing procedure, corruption and so on. However, we do not have satisfactory information about these indicators. Our bureaucracy data is extracted from the NERI index of Marketisation, which is generated according to a large sample survey from business executives on 'how much time you have to allocate to deal with the government in order to keep your business going'. To our knowledge, it is believed to be a good indicator of the bureaucracy, which is available and consistent in 31 provinces over our study period. The higher the index shows, the less bureaucratic and thus more efficient government.

Moreover, we introduce provincial financial development (FinD) into our regression. It is constructed from two sub-indexes in the NERI index of Marketisation. The first index is the ratio of deposits of non- state-owned financial institutes relative to the total deposits of all financial institutes. It shows the development of non- state banks and the reduction of the monopoly power of the four major state banks in China. The higher the index, the more competitive the financial market is. The second sub-index is the share of loans utilised by non- state-owned enterprises relative to the total loans. It is a meaningful indicator because an under-developed financial market tends to discriminate towards non- state-owned firms in China. So the higher the share, the more banks are commercial orientated rather than government policy guided. A more developed financial market provides a lower cost of finance such as borrowing. Thus, we expect an improvement in the financial market to have a positive effect on attracting foreign investment in general. Notably, in the case of acquisition FDI, an under-developed financial market may force private firms to sell their equities to finance their full production potential (Huang, 2003). Therefore, a better financial market may also have negative effect on the acquisition FDI if the procurement opportunity effect in China is large. Thus, we expect financial market development to have different effects on attracting greenfield FDI versus acquisition FDI.

In addition to the external finance perspective, we consider if the effect of financial market development is different according to industries that are highly reliant on external financial or not. The measure is based on the seminal paper by Rajan and Zingales (1998) in which they constructed an index of dependence on

external finance for industries in the U.S. manufacturing sector. The index is calculated as a fraction of external capital expenditure and the authors assumed that this measure should be a valid index for the same industries in other countries as well. In order to fulfil our object, we create an interaction term between industry financial dependence and provincial financial market development. It is constructed as follows:

$$\mathrm{Hfd} * \mathrm{FinD}_{i,s,t} = \mathrm{Hfd}_s \times \mathrm{FinD}_{i,t} \quad \text{(Eq.4-9)}$$

where Hfd_s is the dummy that equals to one if the financial dependence of 2-digit industry *s* is higher than the industry median, and zero otherwise. $\mathrm{FinD}_{i,t}$ is the financial development of a province *i* at year *t*.

There are other unobserved factors such as FDI favourable policies and more regulation provision in some special economic zones or for some industries, which are correlated with the number of foreign invested firms and independent variables. To deal with this problem, we also include year, industry and province dummies (φ) to control for some fixed effects. $\varepsilon_{i,s,t}$ is the error term that is assumed to be independently and identically distributed with a normal distribution and mean zero.

4 Descriptive statistics

In this section, we describe in detail the data of both foreign greenfield investment and acquisition along with some variables of interests. Our research is mainly based on firm-level data extracted from the Annual Report of Industrial

Enterprises filed by the National Bureau of Statistics of China (NBS). It records detailed firm information based on the annual accounting reports of all enterprises in China which had no less than an annual turnover of 5 million Chinese Yuan spanning 31 provinces or province-equivalent municipal cities for the period from 2000 to 2005. Since we are interested in the spatial distribution and location determinants of two foreign investment modes, we aggregate variables of interest in our firm-level data into provincial level data.

In addition to the firm-level data, we employ some provincial-level variables from the NERI index of the Marketisation of China's Provinces (2009) which is collected and documented by National Economic Research Institution (NERI), China Reform Foundation. From different aspects, it conducts a comprehensive comparison on the process of reforming into market economies of 31 Chinese provinces for the period 2000-2007. It records 23 indicators of institutional arrangements and policies in five major areas, which are 1) the efficiency of government in the provincial economy; 2) economic structure, mainly evaluating the weight of private firms; 3) inter-provincial trade barriers; 4) factor-market development, such as financial market development; and 5) legal frameworks, including property rights enforcement. Considering the relevance and the consistency of the statistical method throughout the sample period in our main dataset, we extract two indicators from the data covering the period from 2000 to 2005. They are provincial bureaucracy and financial system development.

In our research, we focus on firms that have foreign investments. To identify

foreign investment firms in China, we rely on information on the equity share held by foreign partners provided by firm-level data. According Chinese EJV law, a joint venture is a firm that the foreign partner's investment ratio is generally not less than 25 percent of the registered total capital. Therefore, we define foreign greenfield or acquisition as follows:

- Foreign greenfield investment happens if a new established firm starts[4] with more than 25 percent foreign equity share.

- Acquisition occurs if foreign equity share increases from less than 25 percent in one year to more than 25 percent in the next.

4.1 Overall trend of foreign greenfield and acquisition investment in China from 2000 to 2005

According to the regional economic classification in China, the country is divided into eastern, central and western regions.[5] In the eastern region, there are coastal provinces which have more developed economies. From the central region towards the western region, there are poorer provinces, which are further away from the ports and less developed. Figure 4-1 presents the overall trend of foreign greenfield and acquisition investment in China across coastal (eastern), central and

[4] Newly established firms are firms that have more than 25% foreign equity share at the time of the opening year. There is a possibility of measurement error if acquired-firm's name is changed after foreign acquisition. In this case, a foreign acquired firm is treated as a greenfield firms.
[5] Classification is from National Bureau of Statistics of China.

western regions in 2001, 2003, and 2005. First, we observe an increase in both modes of foreign investments over time. From 2003 to 2005, we find a drastic increase in foreign greenfield and acquisition investments. Particularly in the case of foreign acquisition, acquisition FDI entries rose from about 1700 to over 4000. In fact, China has had an increase in FDI inflows since 1980s. However, because most firms in China are state-owned and not available for foreign acquisitions and there was no regulatory provision for foreign acquisition, 90 percent of it was greenfield investment in the 1980s and 1990s. Since privatisation in 1990s and the Chinese accession in WTO in December 2001, acquisition targets have become available, as major enterprises have been divested by the state and China's WTO commitments to a phased opening up. The boom in the domestic private sector since the late 1990s also contributes to an increase in acquisition targets. Therefore, the sharp increase of foreign capital inflow during the period can be explained by the higher stock of potential targets and regulation provision.

Then we find that greenfield FDI entries are dominated by acquisition FDI entries in our sample period. As we explained above, since regulation restrictions were removed, the private sector has been growing and state-owned enterprises have been privatising; acquisition replaced greenfield FDI as the most popular investment form of FDI in China in the 2000s.

Thirdly, we find there is a significant geographic dimension in foreign investment in China. Figure 4-1 shows over 80 percent of foreign investment, regardless of the investment mode, took place in coastal regions. Little FDI occurred

in western regions. Indeed, coastal regions, especially in Guangdong and Shanghai, were the location of China's first special economic zones (SEZs). Leaving aside their proximity to large ports, their attractiveness as FDI destinations was mainly due to preferential policy, relatively stronger economic development and lighter bureaucracy compared to other provinces.

Furthermore, we observe a change in the composition of regional FDI inflows in our sample period. The increase in both greenfield FDI and acquisition FDI inflows is disproportionate toward eastern regions. The faster expansion of acquisition FDI inflows in eastern regions may imply that agglomeration economies in coastal regions have yet to reach their limit and agglomeration diseconomies have yet to emerge during our sample period. In theory, it is believed that firms will look for locations in contiguous regions where product and labour competition are lower once the competition effects surpass agglomeration economies in eastern regions. Figure 4-1 may imply that this progressive process has yet to appear. It also shows that China's FDI policy adjustment to guide FDI into China's western interior regions has not been effective during our sample period.

Figure 4-1: Overall Trend of Greenfield and Acquisition FDI [6]in China across three regions

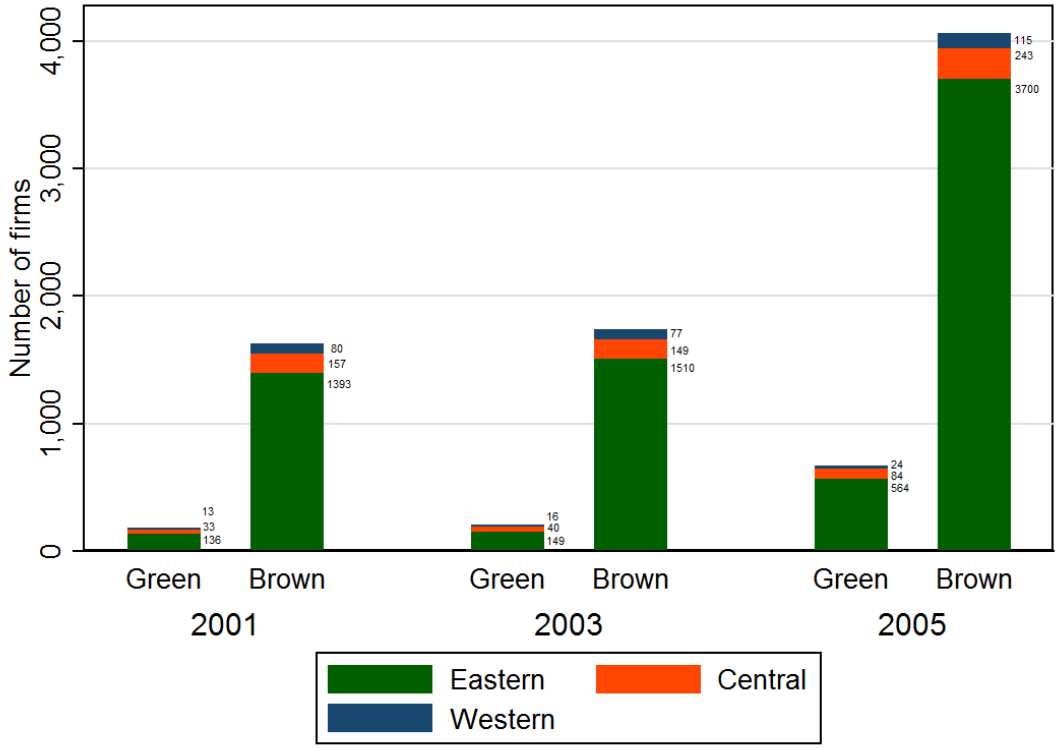


Table 4-1 shows the distribution of greenfield FDI and acquisition FDI at provincial level. We first observe there is also a clear skewed regional distribution in the data. Columns 2 and 4 show the total number of greenfield and acquisition FDI entries respectively. As shown in Table 4-1, although both greenfield and acquisition foreign investments appear to occur in almost all regions except Zero greenfield in Qinghai and Tibet, they are concentrated in more developed coastal provinces such as Guangdong, Jiangsu, Zhejiang, Shandong and Shanghai.

Furthermore, there are some differences between the two modes of foreign investment in terms of their distribution across provinces. For example, greenfield FDI numbers in Shanghai and Guangdong provinces account for 18% of the total

[6] Acquisition FDI is shown as Brown FDI in the figure.

greenfield investment. However, foreign acquisition FDI in these two provinces contributes up to about 50 percent of the total acquisition FDI cases. Two provinces that have mostly greenfield firms are Shandong and Zhejiang. They have about 30 percent of the total greenfield FDI inflows in our sample period. So in general, greenfield FDI projects are more evenly distributed across provinces compared to acquisition.

In column 3 and 5 of Table 4-1, we also consider whether these simply represent the geographical spread of industrial activity in China by presenting the number of foreign greenfield and acquired firms as a percentage of the number of firm-year observations in a region. We find that the average concentration of greenfield foreign firms across all provinces in 0.37 percent of the firm year observations. The greatest concentration of greenfield foreign firms is located in the Fujian province, which is about 1 percent, and the Shandong province, which is 0.9 percent. These two provinces are economically developed regions and have a high stock of firms. The difference of concentration rates across other provinces is less significant. There are about 15 out of 31 provinces with a concentration rate above average. Therefore, the distribution of the concentration rates is not extremely skewed. In contrast, the average concentration rate of foreign acquisition is 2.73 percent of the firm-year observations and there are only 4 out of 31 provinces with rates above average. Therefore, the distribution of foreign acquisition entries is highly skewed toward a few coastal provinces. Also different from greenfield FDI, the greatest cluster of foreign acquisitions is in Shanghai, which has a remarkable 13.5 percent and

Guangdong 6.22 percent. So far, two important messages have been found from Table 4-1. Firstly, coastal regions are more attractive to foreign firms. Secondly, the benefit of being in coastal regions is affecting acquisition FDI more.

To verify the second finding, we carry out our analysis into column 6 and column 7. Column 6 of Table 4-1 is the ratio between the number of greenfield FDI and acquisition FDI in a province. It implies how attractive a province is to foreign greenfield firms relative to foreign acquired firms in China. Ratios are sorted in descending order according to the ratio. Column 7 is the regional classification of provinces where 1 denotes the eastern coastal region, 2 denotes the central region and 3 denotes the western mountainous region. Interestingly, we find that the many coastal provinces labelled region 1 are ranked in the bottom half of the table. Shanghai and Guangdong, which are arguably the most developed provinces and the most favoured FDI destinations in China, are placed at the bottom of the table. Their ratios are only higher than those in Tibet and Qinghai provinces, which have zero greenfield foreign firms established in our sample period.

In general, the ranking confirm that the benefit of locating in coastal regions is affecting acquisition FDI more than greenfield FDI. In other words, the pattern may imply that the agglomeration has less of an effect on attracting greenfield FDI than acquisition FDI. In fact, although agglomeration rents attract both greenfield foreign firms and acquisition FDI to eastern provinces, the competition effect may push some greenfield investments away from highly congested coastal regions as greenfield FDI face more labour and market competition than acquisition projects. Also, acquisition

FDI benefits more from the procurement opportunity effect in developed coastal regions. Therefore, the net effect of agglomeration is smaller on foreign greenfield investment than acquisition FDI.

Table 4-1: Foreign Greenfield v.s. Acquired Affiliates by Provinces

Province	Green	Inten. Of Green[7]	Acq	Inten. Of Acq[8]	Green/Acq	Region[9]
Jiangxi	56	0.65	83	0.97	0.67	2
Guizhou	13	0.31	20	0.49	0.65	3
Anhui	47	0.51	82	0.90	0.57	2
Shandong	370	0.90	771	1.86	0.48	1
Zhejiang	369	0.63	804	1.37	0.46	1
Ningxia	3	0.27	7	0.61	0.43	3
Hebei	73	0.44	176	1.05	0.41	2
Liaoning	133	0.76	325	1.85	0.41	1
Heilongjiang	24	0.40	59	0.98	0.41	2
Shanxi	12	0.15	32	0.41	0.38	3
Jilin	26	0.44	72	1.21	0.36	2
Xinjiang	5	0.17	16	0.58	0.31	3
Hunan	35	0.24	114	0.77	0.31	2
Hebei	39	0.27	137	0.94	0.28	2
Chongqing	11	0.23	39	0.83	0.28	3
Fujian	184	1.10	783	4.63	0.23	1
Guangxi	23	0.33	99	1.41	0.23	1
Jiangsu	300	0.51	1337	2.28	0.22	1
Hainan	5	0.50	24	2.42	0.21	1
Beijing	47	0.41	227	2.13	0.21	1
Tianjin	66	0.60	322	2.92	0.20	1
Sichuan	20	0.17	109	0.91	0.18	3
Inner Mongolia	5	0.14	28	0.80	0.18	3
Shaanxi	7	0.14	40	0.80	0.18	3
Gansu	2	0.03	14	0.26	0.14	3
Yunnan	4	0.01	35	0.90	0.11	3
Henan	13	0.06	142	0.68	0.09	2
Guangdong	302	0.56	3323	6.22	0.09	1
Shanghai	104	0.47	2965	13.50	0.04	1
Tibet	0	0.00	5	0.79	0.00	3
Qinghai	0	0.00	4	0.44	0.00	3
Total	**2293**	**0.37**	**12,204**	**2.73**		

[7] Intensity of Greenfields is the proportion of Greenfields with the total number of firms in a province.

[8] Intensity of across is the proportion of acquisitions with the total number of firms in a province.

[9] Region difference where 1 refers provinces near to coast, 2 refers provinces in central region, 3 refers provinces in western mountainous regions.

In Table 4-2, we repeat the same exercise as we have done in Table 4-1 according to the broad 2-digit industry in which the greenfield foreign firms and foreign acquired firms operate. In general, Table 4-2 shows less industry heterogeneity between the two investment modes. Greenfield investment appears across all 2-digit industries, except in the manufacture of tobacco, and are evenly distributed industry-wise compared to the provincial dimension of the data. The top tow significant clusters are the industries of wearing apparel and communication equipment. They consist of 19 percent of all foreign greenfield investment. Foreign acquisition also takes place across all industry groups. Similar to greenfield FDI, the top two industries that have the highest number of foreign acquisitions are also industries of wearing apparel and communication equipment. They take up 17 percent of all foreign acquired firms in our sample period. We also observe that acquisition is distributed more smoothly across industries than regions. In fact, we find the distribution of foreign-acquired firms is highly correlated with the distribution of foreign greenfield firms across 2-digit industries. As a result, we may expect the industry effect on attracting foreign greenfield versus foreign acquisition is less significant than the effects of location determinants.

The last column of Table 4-2 shows the ratio between the numbers of greenfield foreign firms in an industry relative to the number of foreign acquired firms in the data. It reveals information about the relative attractiveness of 2-digit industries to the two modes of FDI entries. Industries are sorted in descending order according to the ratio. The higher the ratio, the more attractive an industry is to greenfield FDI relative

to acquisition FDI compared to other industries. Generally, we find most industries have small difference in their relative attractiveness ratios. 21 out of 32 2-digit industries have their ratio in a range from 0.21 to 0.11. The top seven industries except electricity are not too different from most of other industries. Their ratio narrowly ranges from 0.26 to 0.29. Although, industries at the top seem to be more capital intensive industries such as electricity, transport equipments and petroleum, their differences are less significant compared to the regional dimension. As a result, it again suggests that there is not a clear pattern of the relative attractiveness in terms of industry characteristics.

Table 4-2: Foreign Greenfield v.s. Acquired Affiliates by Industry

Industry	Greenfield	Inten. Of Greenfield[10]	Acq	Inten. Of Acq[11]	Green/Acq
Electricity, gas and water	46	0.35	126	1.33	0.37
Process of food	130	0.49	445	1.67	0.29
Manufacture of transport equipments and products	131	0.72	449	2.45	0.29
Manufacture of wood	58	0.63	201	2.19	0.29
Manufacture of coke & refined petroleum	9	0.28	32	1	0.28
Manufacture of non-ferrous metals	36	0.46	128	1.65	0.28
Manufacture of basic metals	21	0.2	81	0.78	0.26
Manufacture of communications equipment, computer	187	1.4	882	6.63	0.21
Manufacture of wearing apparel	259	1.22	1242	5.9	0.21
Manufacture of textiles	176	0.49	858	2.41	0.21
Manufacture of food	64	0.62	318	3.09	0.20
Manufacture of rubber products	32	0.69	160	3.43	0.20
Manufacture of general purpose machinery & equipment	115	0.39	605	2.03	0.19
Manufacture of man-made fibres	14	0.61	74	3.23	0.19
Manufacture of medical optical instruments	43	0.8	234	4.36	0.18
Manufacture of chemicals & products	126	0.42	687	2.27	0.18
Tanning & dressing of leather	94	0.94	513	5.15	0.18
Manufacture of other non metallic mineral	97	0.28	537	1.52	0.18

[10] Intensity of Greenfields is the proportion of Greenfields with the total number of firms in an industry.
[11] Intensity of across is the proportion of acquisitions with the total number of firms in an industry.

Table 4-2: Foreign Greenfield v.s. Acquired Affiliates by Industry (Continued)

Industry	Greenfield	Inten. Of Greenfield	Acq	Inten. Of Acq	Green/Acq
Manufacture of special purpose machinery	69	0.39	415	2.38	0.17
Manufacture of furniture	34	0.71	212	4.44	0.16
Manufacture of electrical machinery	124	0.53	786	3.36	0.16
Manufacture of other metals	117	0.48	747	3.03	0.16
Manufacture of pulp paper	37	0.3	240	1.98	0.15
Manufacture of beverages	28	0.4	182	2.58	0.15
Mining and Quarrying	10	0.05	70	0.34	0.14
Manufacture of crafts	59	0.58	424	4.19	0.14
Manufacture of pharmaceutical goods	30	0.39	231	3.03	0.13
Manufacture of plastic products	98	0.51	763	3.96	0.13
Manufacture of sports goods, musical instruments, game, toy and stat	38	0.72	357	6.72	0.11
Publishing &printing	11	0.13	184	2.25	0.06
Manufacture of tobacco products	0	0	0	0	0
Recycling	0	0	16	0.44	0
Total	**2,293**	**0.51**	**12,204**	**2.72**	

4.2 Descriptive analysis of variables

The description of the benchmark variables including expected sign, sources, means and standard deviations are presented in Table 4-3. The number of greenfield foreign firms and foreign acquired firms are dependent variables in our regression analysis. As we find that the standard deviations of two variables are much larger than their means, we believe that there is an over-dispersion in the count data. Therefore, a negative binomial model is preferred over the Poisson model in our count data analysis. The other variables are explanatory variables that are in logs and lagged by

one period. In our analysis, we also create an interaction term, which is the combination of the industry financial dependence dummies and the provincial financial development. Considering the potential endogeneity issue, for example possible reverse causality between foreign investment and financial market conditions, we lag independent variables one year to reduce the possible reverse causality. Furthermore, bureaucracy and financial market, particularly in China, are not likely to vary much across time. Most variations come from regional differences. Thus it is believed that possible reverse causality has a limited effect on the results.

Table 4-3 Definition of Variables

	Variables	Description	Source	Mean	Standard deviation
Count of Greenfield FDI	$FI_{green\ i,s,t}$	Number of foreign Greenfield firms	China Annual Survey of Industrial Enterprises	4.81	8.87
Count of acquisition FDI	$FI_{acq\ i,s,t}$	Number of foreign acquired firms	China Annual Survey of Industrial Enterprises	43	64.28
Demand-side agglomeration	$Agg\_demand_{i,s,t}$ +	Log province-sector output	China Annual Survey of Industrial Enterprises	16.93	1.46
Number of firms	$Agg\_firm_{i,s,t}$ +/-	Log of the average number of firms per squared kilo meter	China Annual Survey of Industrial Enterprises	3.76	1.69
Stock of foreign plants	$Agg\_FDI_{i,s,t}$ +	Log of number of manufacturing foreign plants within the province	China Annual Survey of Industrial Enterprises	1.28	2.13
Wage variation	$Wage\_CV_{i,s,t}$ -	Log of coefficient of variation of wage	China Annual Survey of Industrial Enterprises	0.92	0.42
Bureaucracy	$BU_{i,t}$ -	Log of hours to deal with government officials index	The NERI Index of Marketisation of China's Province	1.50	0.82
Financial development	$FinD_{i,t}$ +	Log of non-state bank deposits and loans to the total index	The NERI Index of Marketisation of China's Province	1.81	0.57
F-dependence* F-development	$Hfd * FinD_{i,s,t-1}$	Log of High Dependence on external finance (Dummy)* Financial development index	Rajan and Zingales (1998)& The NERI Index of Marketisation of China's Province		

In order to get a first glimpse of the relationship between the explanatory variables on the one side and two investment modes on the other side, we investigate the correlation matrix between the variables in which we are interested. Table 4-4 shows the correlation between the two investment modes and independent variables at year-sector-province level. A higher market demand indeed positively correlates with

the number of greenfield foreign firms and foreign acquired plants. The stock of firms is also positively correlated with two modes of investment. It may indicate that agglomeration rent is positive, as the congestion-like competition effect has not passed agglomeration economies. We also find that the numbers of greenfield and acquisition FDI entries are highly positively related to the concentration of foreign incumbents, provincial bureaucracy and financial development as we expected. The size of correlation with the two modes of FDI is different, especially in the concentration of firms, the cluster of foreign firms and bureaucracy. The variation of wages of an industry in a province seems to have a very small effect on attracting both modes of foreign investments.

Table 4-4: Correlation between Investment Modes in Each Sector, Region and Year and the Independent Variables.

	Greenfields	Acquisitions
Greenfields	1	
Acquisitions		1
Demand-side agglomeration	0.551	0.558
Number of firms	0.426	0.528
Stock of foreign plants	0.447	0.576
Wage variation	0.086	0.027
Bureaucracy	0.206	0.409
Financial development	0.384	0.386

In order to illustrate a graphical overview of the correlations, we plot correlations for some important variables with the two modes of foreign investments from Figure 4-2 to Figure 4-5. In Figure 4-2, the vertical axis presents the number of firms and horizontal axis stands for the demand-side agglomeration which is measured by the log of output level. Each point illustrates the corresponding output level of the average number of newly established greenfield firms in a province over our sample period. We find the correlation is positive. Figure 4-3 also shows a positive relationship between number of acquisition FDI and provincial demand-side agglomeration. Figure 4-4 and Figure 4-5 demonstrate relationships between the two modes of foreign investment and the number of incumbents respectively. We also find a clear positive relationship in both figures. To quantify and compare these relationships, we carry out our econometric analysis on the location determinants of greenfield and acquisition foreign firms in the section of empirical results.

Figure 4-2: Correlation of the Demand-side Agglomeration with number of Greenfield. (Mean 2000 to 2005)

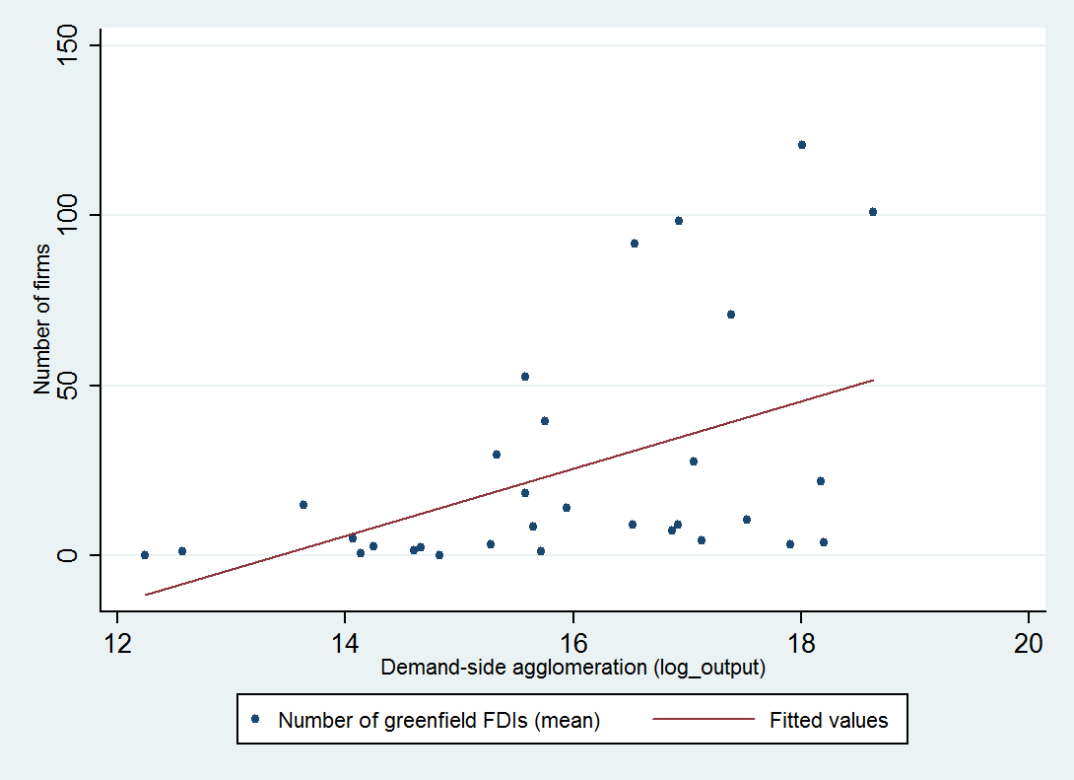


Figure 4.3: Correlation of the Demand-side Agglomeration with Number of Acquisition FDI (Mean 2000 to 2005)

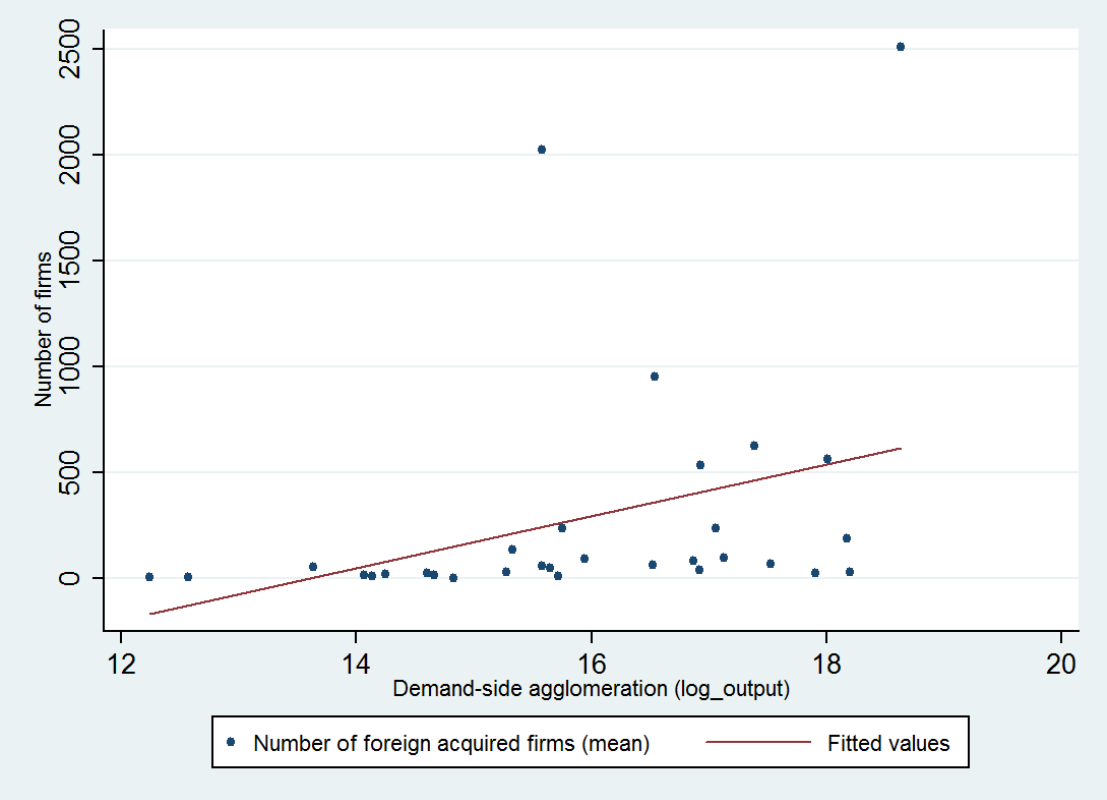


Figure 4-4: Correlation of Number of Incumbents with Number of Greenfield FDI. (Mean 2000 to 2005)

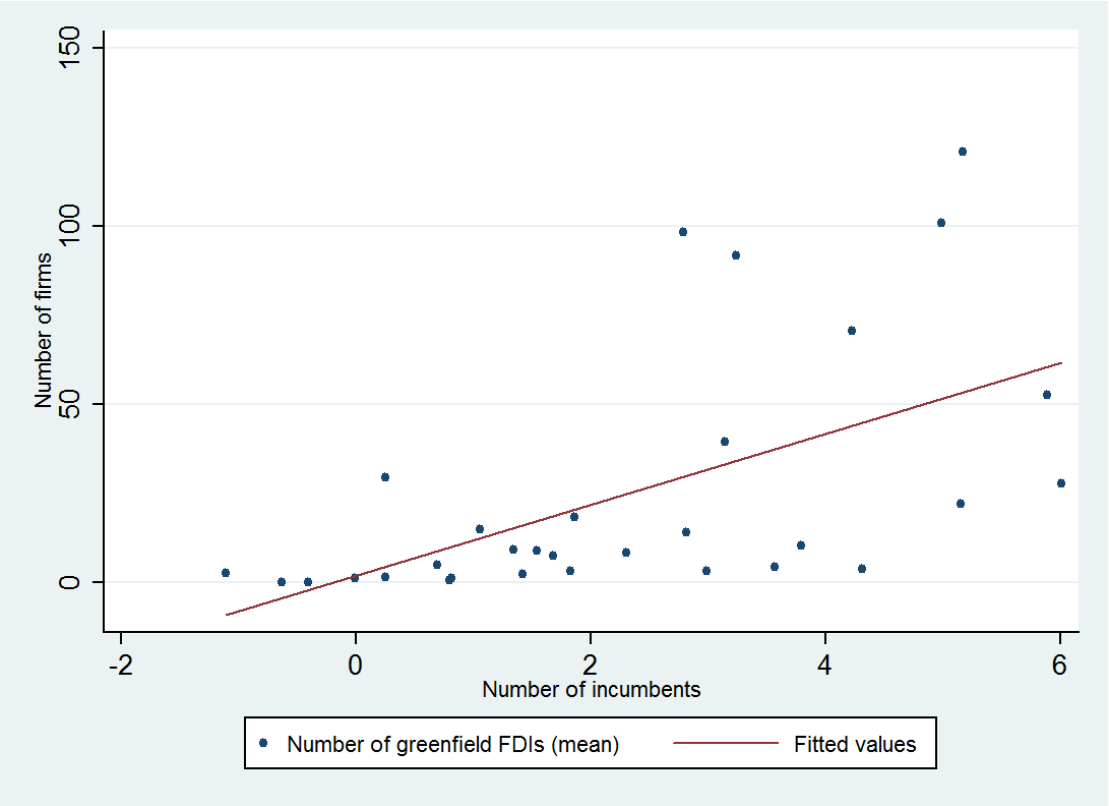
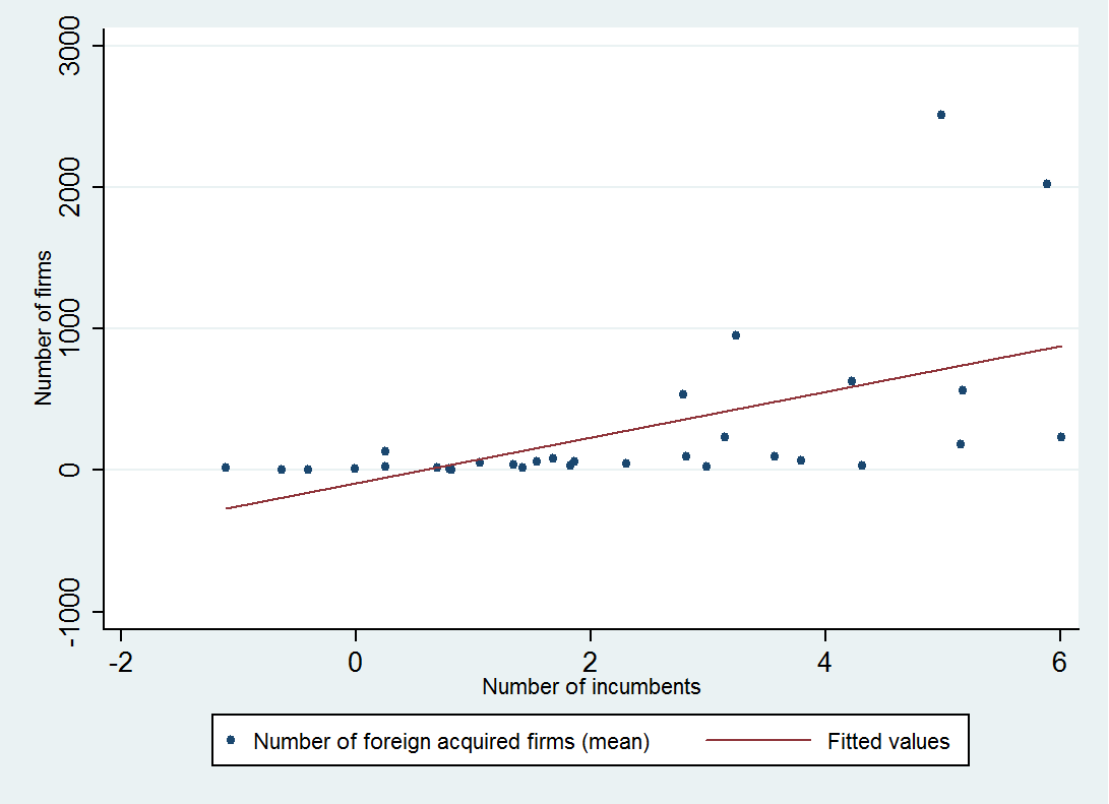


Figure 4-5: Correlation of number of Incumbents with number of Acquisition FDI. (Mean 2000 to 2005)



4.3 Overall trend of financial market development and bureaucracy

Apart from the variables constructed from our firm-level dataset, the bureaucracy and financial market development index from the NERI index of Marketisation of China's province (2009) are also employed in our investigation. As we are particularly interested in the effect of financial market developments on the location attractiveness of foreign investment inflows, we present the overall trend of financial market development of all provinces in Figure 4-6.

Figure 4-6 shows how much the financial market development varies between regions and across time. We have compared the variations between 2000 and 2005. First, how far the province is from the origin at x-axis and y-axis indicates how good the province financial market was in years 2000 and 2005 respectively. We find that coastal regions have more greenfield and acquisition FDI entries also have more developed financial markets such as Guangdong, Shanghai, Zhejiang. Secondly, we find that more regions are above the 45-degree line, which indicates that discrimination faced by non-state-owned enterprises from local financial institutions became lower in most regions. Thirdly, the further away from the 45 degree line, the more it implies that there has been greater change in the financial market during five years. We observe that financial markets in the coastal regions such as Guangdong, Shanghai, and Zhejiang have made faster improvements than other regions. Therefore, although, the financial market is opening up in all provinces in China, coastal regions that start with better financial markets also have a faster development speed.

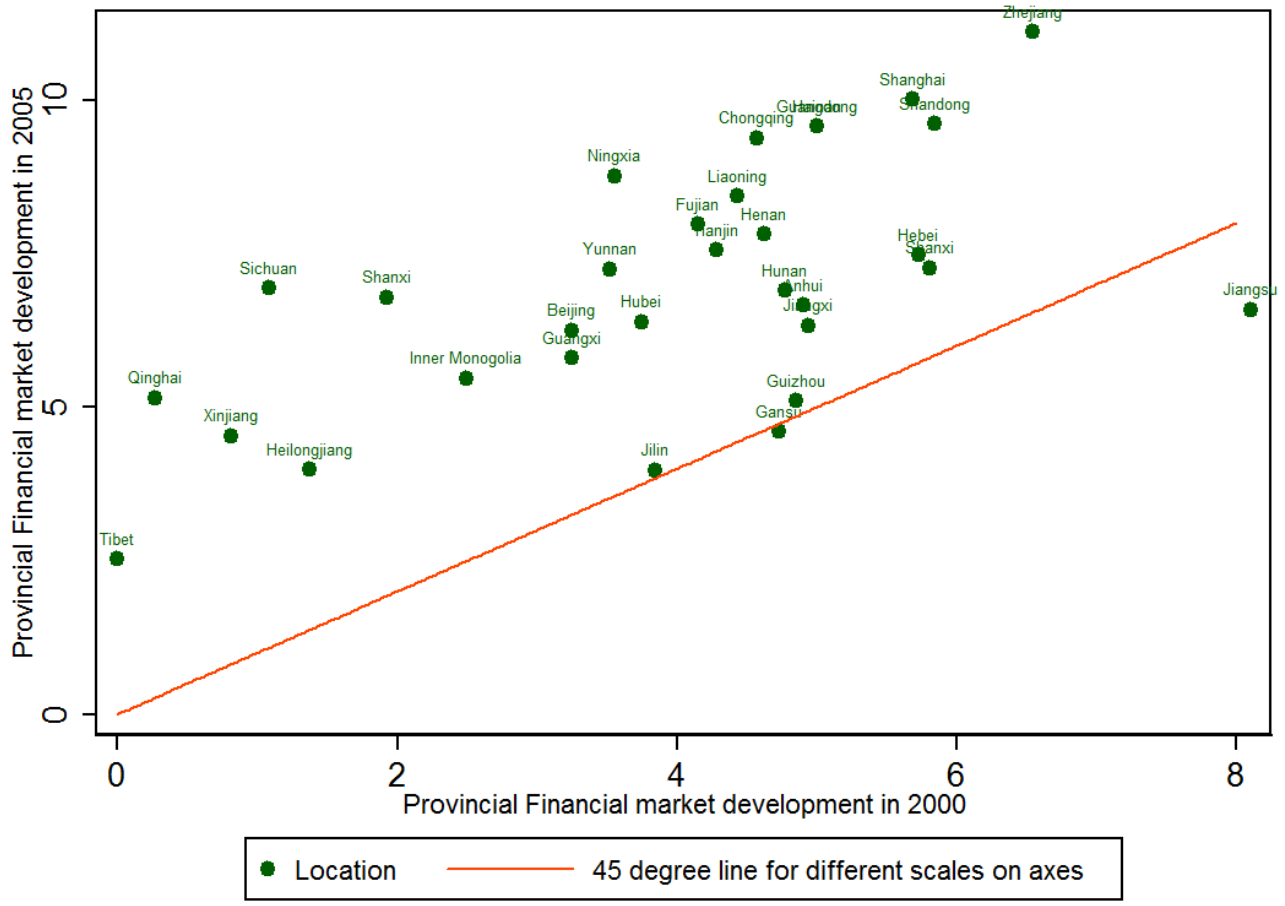


Figure 4-6 Provincial Financial Market Development

5 Regression results

In this section, firstly, we discuss how location determinants have had effects on attracting greenfield and acquisition FDI separately. Secondly, we investigate whether location characteristics have different effects on greenfield FDI versus acquisition FDI. Thirdly, we specifically discuss whether provincial financial development has different effects on greenfield FDI compared to acquisition FDI according to their different reliance on external finance. In addition to the benchmark regression specifications used in each of three subsections, we also check our benchmark results by assuming that agglomeration effects within a province do not only come from the province itself but also depend on its relative position to other provinces.

5.1 Location determinants of greenfield FDI

5.1.1 Benchmark empirical results

Table 4-5 reports results showing how location determinants have effects on attracting greenfield FDI inflows. Firstly, in the Model (1), we tested effects of three location-sector level agglomeration determinants as well as wage variation, bureaucracy and financial development with a full set of year, industry and region dummies. We introduce year, industry, and province dummies to control for unobserved time-, industrial and provincial level specific factors such as FDI preferential policies that may affect both the number of greenfield foreign entries and correlate with the independent variables.

The negative binomial random effect estimated coefficient of demand-side

agglomeration is positive and significant at the 99 percent level. It indicates that foreign greenfield firms are concentrated in provinces where the output of the respective industries is highest. Intuitively, foreign greenfield firms, similar to all firms, tend to select sites where they believe there is a potential to generate the greatest profits. According to Krugman (1991), higher expected profits are strongly associated with market access. Therefore, the positive and significant coefficient is consistent with our hypothesis. However, the size of the effect is negligible. The elasticity of the demand-side agglomeration (output) is at 0.0765 percent. It can be interpreted as a one percent extra increase in the output level of an industry within a province is related with a 0.0765 percent increase in the expected number of foreign greenfield firms. The average marginal effect (AME) equals $\hat{\beta}\bar{y}$, where $\bar{y}$ is the mean of the number of foreign greenfield firms in a sector within a province. So on average, one percent more output level of an industry within a province induces a 0.0037[50] additional number of greenfield FDI entries in an industry within a province.

[50] It is calculated as 0.765%*4.81= 0.037

Table 4-5: Foreign Greenfield Investments' Location Determinants in China

	Dependent variable: the number of greenfield FDI entries				
	(1)	(2)	(3)	(4)	(5)
	Count model: Negative binomial				
Demand-side agglomeration	0.0765*		0.0692***	0.0728***	0.0752***
	(1.75)		(1.95)	(2.08)	(2.37)
Number of firms	-0.436***	-0.582***		-0.615***	-0.585***
	(-2.79)	(-3.43)		(-3.52)	(-3.47)
Stock of foreign Plants	0.634***	0.666***	0.679***		0.658***
	(28.73)	(17.03)	(19.22)		(17.28)
Wage variation	-0.0497***	-0.0751***	-0.0746***	-0.0334***	-0.0752***
	(-2.65)	(-2.18)	(-4.99)	(-4.96)	(-4.35)
Bureaucracy	-0.117***	-0.199***	-0.270***	-0.231***	
	(-3.00)	(-5.97)	(-8.71)	(-7.79)	
Financial Development	0.140	0.139*	0.1801	0.181	
	(1.06)	(1.81)	(1.09)	(1.44)	
Year Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Province Dummy	Yes	Yes	Yes	Yes	Yes
Cons	3.988	-8.110***	-5.728***	-5.481*	-8.109***
	(0.50)	(-12.36)	(-5.66)	(-1.98)	(-13.28)
ln_r					
Cons	9.805	2.748***	3.974***	5.535*	2.561***
	(1.24)	(8.39)	(5.41)	(2.22)	(9.55)
ln_s					
Cons	2.414***	0.463***	0.868***	1.390***	0.461***
	(11.01)	(3.56)	(6.26)	(7.42)	(3.55)
N	2590	2543	2543	2543	2590

Note: The dependent variable is the number of greenfield plants invested by foreign investors in each province and in each sector at a certain year. Model specification is the negative binomial model with random effects. *t* statistics are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The ln_r and ln_r lines refer to ln(r) and ln(s), where the inverse of one plus the dispersion is assumed to follow a Beta (r,s) distribution.

The second agglomeration measure is the number of firms in an industry within a province scaled by the area of the province. We find the coefficient is negative and statistically significant. It illustrates that the higher the number of existing firms in the same industry within a province, the greater the reduction in greenfield FDI plants in the province. As we have already point out, from the agglomeration economies aspect, we should expect a positive sign for the coefficient as a cluster of firms generating economies of scale and network externalities. For example, a large number of firms in the same industry may reduce the costs of production because of greater specialisation and division of labour. Furthermore, according to cumulative causation theory, this cluster may also attract more suppliers and customers into the region. However, there is also an opposite force from a high concentration of firms. From the congestion-like competition point of view, the greater the number of firms of an industry located in a province, the higher the congestion-like competition exists in the product and labour market. It may divert greenfield FDI inflows in other locations. The coefficient is about -0.436 percent, indicating the one percent increase in the number of firms of an industry in a province results in 0.436 percent reduction in the expected number of greenfield foreign entries. The marginal effect can be explained as a one percent increase in the number of firms preventing 0.021[51] firms to locate in the province. Consequently, it is evident that attraction forces are dominated by centrifugal forces due to the competition effect.

The third independent variable is also an agglomeration measure. It is measured

[51] It is calculated as 0.436%*4.81=0.021

by the stock of foreign plans. We observe that the coefficient is positive and statistically significant. It implies that the more foreign plans are operating in the province, the more attractive the location is to greenfield foreign entries. Our result is consistent with the 'follow-the-leader' pattern of foreign investment. As we have discussed, the existence of similar foreign firms in the host location provides pivotal signals to foreign investors who face difficulties in observing the benefits and costs of locating to the province. We also find the size of the effect is considerable. Greenfield foreign investments generally carry high uncertainty. Thus, they may rely highly on signals from foreign incumbents. The elasticity of the stock of foreign plants is about 0.634 percent, indicating that one more percent increase of the foreign firms of the same industry in a province encourages an additional 0.030[52] foreign greenfield plants in the province on average.

Furthermore, in Model (1), the fourth explanatory variable is the sector-province level coefficient of variation of wage. Its coefficient is negative and statistically significant, showing that the higher the variation of labour cost of an industry in a province, the less appealing the province is to greenfield foreign entry. The result is consistent with our expectation as we assume a higher wage variation of an industry indicates a less competitive and imperfect labour market of an industry within a region. By assuming China offers abundant labour supply, a less competitive labour supply leads to a possible higher labour cost of the industry in a host location, which discourages FDI entry. One important note we need to make here is that our

[52] It is calculated as 0.634%*4.81=0.030

province-sector level wage is aggregated from the firm level wage. We do not have any information about the skill or quality of the labour. Therefore, although the variation may indicate the competitiveness of labour supply to some extent, we cannot isolate variation of wage that is caused by the difference of labour skills in an industry.

The next two independent variables in column (1) are year-province level government efficiency and financial development. the coefficient of bureaucracy is negative and significant as we expect. It implies less greenfield investment tends to locate in a province which is highly bureaucratic. The size of the effect of bureaucracy is small compared to agglomeration factors except demand-side agglomeration. The elasticity of bureaucracy is about -0.20 percent.

It is worth noting that the coefficient on financial development is positive and insignificant. It is an interesting result because we expect a more developed financial market to be more appealing to all investments as well as foreign greenfield investments. One explanation of the insignificant relationship may be grounded on the nature of the greenfield firm. Rather than acquisition, greenfield FDI investment may rely less on external finance from the host location because the investment is directly financed by the capital from overseas' investing headquarters.

From Model (3) to Model (5), we carry out robustness analysis to test the robustness of the sign and significant of the estimated coefficient on the key independent variables to the inclusion or exclusion of evidently, co-linear independent variables. Having found agglomeration connected variables, bureaucracy, and

financial development is evidently correlated with the number of greenfield foreign plants, we exclude demand-side agglomeration in column (2), number of firms in column (3), stock of foreign plants in column (4), and both bureaucracy and financial development in column (5).

In Model (2), after the exclusion of the demand-side agglomeration, we observe that most coefficients vary little in size, sign and significance compared to the results in the baseline model. In Model (3) and (4), we drop number of firms and stock of foreign plants from our benchmark regression respectively. We find neither change the sign, or significance of the coefficients of the explanatory variables compared to Model (1). The change of the magnitude of effects of location determinants is also very limited. Considering government efficiency and financial development is possibly correlated with three agglomeration variables, we exclude both variables in the Model (5). All coefficients of agglomeration variables remain statistically significant. The change in the size of the effect is relatively small.

To summarize, Table 4-5 shows our benchmark analysis on the location determinants of greenfield investment. With inclusion of time-, industry-, and province-dummies, Model (1) presents the most general results based on our benchmark specification. In general, we find that a province with a larger market, less concentrated firms but more established foreign forerunners, and a less bureaucratic government is more attractive to foreign greenfield investments.

5.1.2 Empirical results with consideration of geographic proximity

So far, our analysis has been based on the assumption that agglomeration effects only come from the province itself. However, as we have discussed, the agglomeration is much wider as it is also affected by linkages between other regions. Inspired by a precursor framework by Harris (1954)'s market-potential function, we add a gravity-adjusted specification into the agglomeration-connected variables, namely, demand-side agglomeration, number of firms and stock of foreign plants. Then we verify whether our results change under a more general assumption.

Table 4-6 shows how location characteristics have affected the attraction of foreign greenfield firms with consideration of the province's relative position to other provinces. In model (1), we examine three agglomeration-connected variables along with other regional characteristics. Compared with the results in Table 4-5, we find all signs and significances remain the same except demand-side agglomeration. Results indicate that provinces that have fewer firms of an industry, more foreign incumbents and more efficient governments are more attractive in the eyes of the greenfield investors. The wage variation and financial development remain irrelevant to the number of greenfield foreign entries. The only difference comes from the coefficient of the demand-side agglomeration. Its effect becomes insignificant when geographic proximity is taken into account. This may be explained by markets in proximity attracting greenfield FDI. Nevertheless, the size of the demand-side agglomeration effect is tiny at 0.077 percent in our benchmark results. Therefore, in general, our result is robust even if we expand our agglomeration specifications by considering the

location's proximity to all other provinces.

From model (2) to model (5), we include or exclude evidently, co-linear variables to test whether the sign and significance of the estimated coefficient on the agglomeration variables are robust. Compared with our benchmark results in model (1), we do not observe any alter of the sign and significant levels on the key independent variables.

Table 4-6: Foreign Greenfield Investments' Location Determinants in China with Consideration on Proximity

	Dependent variable: the number of foreign greenfield entries				
	(1)	(2)	(3)	(4)	(5)
	Count model: Negative binomial with proximity				
Demand-side agglomeration	0.0389		0.0525	0.0578	0.0544
	(0.90)		(0.54)	(0.13)	(0.27)
Number of firms	-0.154**	-0.385***		-0.408***	-0.345***
	(1.96)	(-6.62)		(-6.86)	(-5.79)
Stock of foreign Plants	0.809***	0.554***	0.602***		0.599***
	(18.39)	(12.56)	(15.17)		(13.09)
Wage variation	0.133	-0.0854	-0.295***	0.0558	-0.173*
	(1.62)	(-0.90)	(-3.54)	(0.64)	(-1.81)
Bureaucracy	-0.107***	-0.132***	-0.230***	-0.182***	
	(-2.45)	(-3.52)	(-6.85)	(-5.67)	
Financial Development	-0.0580	0.751***	0.440***	0.507***	
	(-0.19)	(9.28)	(5.82)	(6.40)	
Year Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Province Dummy	Yes	Yes	Yes	Yes	Yes
Cons	1.753	-5.737***	-4.805***	-5.223***	-6.278***
	(0.61)	(-9.62)	(-6.38)	(-4.27)	(-10.79)
ln_r					
Cons	5.436**	2.068***	3.260***	4.105***	1.818***
	(2.04)	(8.16)	(6.81)	(4.37)	(8.44)
ln_s					
Cons	1.113***	-0.0525	0.445***	0.820***	-0.120
	(7.45)	(-0.46)	(3.87)	(5.51)	(-1.02)
N	3398	3398	3398	3398	3398

Note: The dependent variable is the number of greenfield foreign investors in each province and in each sector at a certain year. Model specification is the negative binomial model with random effects. *t* statistics are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The ln_r and ln_r lines refer to ln(r) and ln(s), where the inverse of one plus the dispersion is assumed to follow a Beta (r,s) distribution.

5.2 Location determinants of acquisition FDI

5.2.1 Benchmark empirical results

Similar to our analysis in the case of greenfield FDI, we regress the year-sector-province level variables that are connected with agglomeration and other regional characteristics in the Model (1). To control for unobserved time, industry and province variations that may affect the location attractiveness to acquisition FDI inflows, we include year, sector and province dummies. After presenting our benchmark analysis, then we exclude or include evidently, co-linear right-hand side variables to check the robustness of the sign and significance of the estimated coefficient on the agglomeration connected variables. According to the correlation matrix in Table 4-4, we exclude demand-side agglomeration in column (2), number of firms in column (3), stock of foreign plants in column (4), and bureaucracy and financial development in column (5). In general, the results show limited changes in the size, sign and significance of the estimated effect of the agglomeration connected variables.

Our benchmark is presented in Table 4-7. In general, we find that signs and significant of most variables are consistent with our expectations. First of all, demand-side agglomeration has a positive and significant effect in attracting acquisition FDI inflows in all five models except model (2) in which demand-side agglomeration variable is excluded. However, we observe the size of the effect is relative small compared with the other two agglomeration variables.

Then we find that coefficients of number of firms are positive and significant in

the benchmark analysis, indicating that the number of firms has a positive effect on attracting acquisition FDI when we control for all specific effects. Admittedly, firms operation in the market with a relative large number of incumbents face strong congestion-like competition in product and labour markets. However, the cluster of incumbents may also act in an attraction role to acquisition FDI inflows as it provides more suppliers and customers into the region. More importantly, in the case of foreign acquisition, the number of firms may be interpreted as proxying procurement opportunities. The greater the number of firms operating, the supply of potential acquisition targets is higher. Although it is hard to disentangle all these effects, the opposite effect may give us a clue as to which force is more important. A positive coefficient in the Model (1) shows the attraction force surpasses the centrifugal force. Compared with the negative result in the case of greenfield FDI, it implies the procurement opportunities play an important role in alluring more acquisition FDI into the region. Our result is consistent with that of Roberto (2004) and with many other studies which conclude the number of manufacturing incumbents has a positive influence on FDI inflows. It also explains why we observe a drastic increase in acquisition FDI as more targets are available after 2000.

Thirdly, it shows that a positive and significant coefficient on foreign stock is robust across all models, indicating that more foreign incumbents of the same industry in a province could encourage more acquisition FDI entries into the province. It is in line with Roberto (2004) who describes the FDI stock as an important signal of how 'friendly' to foreign investors a location is when have limited information about the

host location. In Model (1), the coefficient of the stock of foreign plants is high at 68 percent even taking into account year, sector and province specific effects. The marginal effect implies that one percent of the number of foreign firms of an industry in the region stimulates additional 0.29[53] foreign acquired plants in the province. We also find a consistent negative and significant coefficient of wage variation across five models, revealing that higher wage variation in the province may divert some acquisition FDI entries away to other locations.

Fourthly, one striking result we find is that the coefficient of bureaucracy is negative and insignificant in all models[54]. It implies that a more bureaucratic government will have no effect on attracting acquisition FDI. It is surprising that we do not find a significant negative relationship, but an insignificant relationship may reinforce one advantage of acquisition for foreign investors. Considering our bureaucratic data is generated from the hours that managers spend on keeping a relationship with government officials, managers of acquired establishment may have already built good communications with local government. Acquisition investment takes over assets as well as employees. Therefore, employees taken from acquired establishment help foreign investor in keeping a good relationship with local government. The bureaucracy becomes less important to acquisition investors.

Finally, we find positive coefficients of financial development in all models. This provides robust evidence showing that financial development has a positive effect in attracting greater acquisition foreign investments. The results is consistent with the

[53] It is calculated as 0.68%*43=0.29

[54] As we have discussed in the Chapter 2, literature has shown that an improvement in institution has positive an impact on foreign acquisition.

descriptive analysis that financial market are better and have improved faster in coaster regions in which experience more acquisition FDI entries. In addition, we have not yet considered industry characteristics with respect to financial market development. It is interesting to understand whether that foreign capital acts as a more important substitution role to replace local financial institutions in industries, which are highly dependent on external finance. We will tackle this argument in later discussions.

Table 4-7: Foreign Acquisitions' Location Determinants in China

	Dependent variable: the number of foreign acquisition entries				
	(1)	(2)	(3)	(4)	(5)
	Count model: Negative binomial				
Demand-side agglomeration	0.0465***		0.0657***	0.0762***	0.0659***
	(2.35)		(3.03)	(3.41)	(3.79)
Number of firms	0.224***	0.255***		0.345***	0.264***
	(9.72)	(9.25)		(12.65)	(9.51)
Stock of foreign Plants	0.681***	0.547***	0.547***		0.578***
	(40.61)	(26.54)	(27.23)		(28.82)
Wage variation	-0.150***	-0.676***	-0.703***	-0.400***	-0.714***
	(-4.33)	(-13.35)	(-14.42)	(-8.40)	(-14.19)
Bureaucracy	-0.0148	-0.0108	0.0147	0.0113	
	(-0.66)	(-0.41)	(-0.59)	(-0.59)	
Financial Development	0.259***	0.182***	0.218***	0.207***	
	(2.09)	(4.52)	(5.53)	(5.43)	
Year Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Province Dummy	Yes	Yes	Yes	Yes	Yes
Cons	1.511	-5.210***	-5.228***	-7.090***	-5.559***
	(1.22)	(-12.52)	(-9.03)	(-11.77)	(-15.19)
ln_r					
Cons	6.005***	3.130***	3.720***	4.074***	2.905***
	(5.37)	(10.66)	(7.65)	(8.80)	(12.46)
ln_s					
Cons	2.652***	0.991***	1.022***	1.466***	0.995***
	(23.92)	(14.28)	(15.31)	(19.87)	(14.25)
N	2590	2543	2543	2543	2590

Note: The dependent variable is the number of firms acquired by foreign investors in each province and in each sector at a certain year. Model specification is the negative binomial model with random effects. *t* statistics are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The ln_r and ln_r lines refer to ln(r) and ln(s), where the inverse of one plus the dispersion is assumed to follow a Beta (r,s) distribution.

5.2.2 Empirical results with consideration of geographic proximity

As we have explained, agglomeration effects do not only come from the province itself, they are widely linked with its relative position to other regions. Then in Table 4-8, we regress gravity-adjusted agglomeration specifications to check whether our findings in the benchmark analysis held. Similar to previous discussions, we first add all agglomeration connected variables, wage variation, government bureaucracy and financial market development in the Model (1). With control for time, industry and regional fixed effects, Model (1) shows our benchmark results. Since agglomeration variables, bureaucracy and financial development are evidently co-related with foreign acquisition, we include or exclude co-linear right-hand side variables to check the robustness of the sign and significance of the estimated coefficient on agglomeration variables. We exclude demand-side agglomeration in the column (2), number of firms in column (3), stock of foreign plants in column (4) and finally bureaucracy and financial development in column (5). In general, we find sign and significance remains the same in our robustness checks. Our discussion below is based on the results of the benchmark model in column (1).

In line with the benchmark results, we find that number of firms of an industry has a positive effect in attracting more acquisition FDI projects into the region, implying effects of procurement opportunities and agglomeration positive externalities surpass effects of congestion-like competition. We also confirm that foreign acquisitions tend to locate to where there are more foreign incumbents, giving a hint that predecessors are important to foreign acquirers who have limited

information about the host location. Furthermore, the insignificant effect of government efficiency and the positive effect of financial market development are also robust with new specifications. One important change compared to the benchmark result is that the effect of demand-side agglomeration becomes insignificant. However, the coefficient in our benchmark specification is significant but negligible in size anyway. Therefore, in general, we observe that our results on a location's linkages with other provinces are consistent with the benchmark results.

Table 4-8: Foreign Acquisitions' Location Determinants in China with Consideration of Geographic Proximity

	Dependent variable: the number of foreign acquisition entries				
	(1)	(2)	(3)	(4)	(5)
	Count model: Negative binomial				
Demand-side agglomeration	0.0000371		0.0000343	0.0000362	0.0000368
	(0.00)		(0.00)	(0.00)	(0.00)
Number of firms	0.295***	0.252***		0.202***	0.213***
	(11.10)	(11.08)		(11.98)	(13.58)
Stock of foreign Plants	0.576***	0.537***	0.539***		0.584***
	(30.28)	(24.23)	(24.30)		(25.00)
Wage variation	0.00478	0.00283	0.00282	0.00416	0.00325
	(0.13)	(0.61)	(0.58)	(0.81)	(0.23)
Bureaucracy	0.000883	0.0688**	0.0792***	0.112***	
	(0.03)	(3.16)	(3.56)	(5.25)	
Financial Development	0.279**	0.533***	0.512***	0.477***	
	(2.01)	(13.31)	(12.40)	(11.38)	
Year Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Province Dummy	Yes	Yes	Yes	Yes	Yes
Cons	-5.101***	-5.064***	-5.014***	-6.563***	-5.622***
	(-0.28)	(-15.28)	(-15.05)	(-15.46)	(-17.95)
ln_r					
Cons	3.491***	2.519***	2.522***	3.079***	2.180***
	(31.80)	(14.19)	(14.24)	(11.45)	(15.78)
ln_s					
Cons	2.368***	0.839***	0.844***	1.058***	0.755***
	(22.63)	(12.36)	(12.44)	(14.65)	(11.08)
N	3398	3398	3398	3398	3465

Note: The dependent variable is the number of firms acquired by foreign investors in each province and in each sector at a certain year. Model specification is the negative binomial model with random effects. *t* statistics are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The ln_r and ln_r lines refer to ln(r) and ln(s), where the inverse of one plus the dispersion is assumed to follow a Beta (r,s) distribution.

5.3 Comparing effects of location determinants on greenfield FDI versus acquisition FDI

Table 4-5 and Table 4-7 have already shown some obvious different effects of location determinants in attracting greenfield FDI versus acquisition FDI. We find a significant negative coefficient in the number of firms in the case of greenfield foreign entries, while we find it has a significant positive effect in the case of acquisition foreign investment. The difference may be because of procurement opportunity effect. As we explained, apart from agglomeration economies and diseconomies that are common to all investments, a large number of incumbents also provide potential targets of acquisitions. In the case the procurement opportunities play an important role in attracting acquisition FDI, we find the effect of the concentration of firms is different in attracting the two modes of foreign investments.

However, it is not straightforward when trying to demonstrate whether some other important agglomeration issue connected determinants have different effects on two FDI modes. For example, we find the demand-side agglomeration has a positive effect on attracting both greenfield FDI and acquisition FDI. In order to provide a direct comparison on how location determinants have different impacts on greenfield FDI versus acquisition FDI, we regress the ratio of number of greenfield firms over the number of foreign acquired firms of an industry in a province with all explanatory variables by using OLS specifications. Results are shown in Table 4-9. Model (1) is the baseline model with all right-hand side variables and dummies. From column (2) to column (5), we conduct the robustness analysis to check the sign and significance

of the estimated coefficient on the agglomeration connected variables to the inclusion and exclusion of co-linear right-hand side variables according to the correlation matrix in Table 4-4, as we have done in previous analysis. In general, we find almost all agglomeration connected variables are statistically significant in all specifications. It indicates that regional agglomeration characteristics indeed have different effects on attracting greenfield FDI inflows versus acquisition FDI inflows. Our discussions below concentrate on the benchmark specification in column (1).

First, we find a positive and significant coefficient on the demand-side agglomeration in Model (1). It confirms that demand-side agglomeration encourages not only both modes of foreign investment, but also has a relative stronger impact on the location decision of greenfield foreign investment. In fact, one difference between greenfield and acquisition investment is that greenfield FDI entries need to earn a market share from zero but acquisition FDI has taken over the market share of acquired firm. A larger market potential may imply a greater opportunity to penetrate into the market for greenfield FDI. As a result, greenfield foreign investors may be more reliant on a larger market potential than acquirers.

Then we find a negative and significant coefficient of the numbers of firms in all five models except model (3). It reinforces our results in previous discussions that the number of firms has an opposite effect on both greenfield FDI and acquisition FDI. As we have explained, greenfield foreign investors see a large number of firms in the same industry more like a sign of high-level of competition, while foreign acquirers believe that a group of clusters of similar firms provides more potential targets. In

addition, it is also relevant that greenfield foreign investors need to compete against all existing firms while acquisition can eliminate a competitor in the market. In fact, we have suggested that foreign acquisition in China is cherry-picking in the previous chapters. It implies foreign investors may acquire one of the biggest competitors in the market. Therefore, compared with greenfield investment, acquisition may be less affected by competition effects that drive investors away from the location.

Furthermore, we find a consistent positive and significant coefficient of the stock of foreign plants in all models except model (4). It indicates that both modes of foreign investors rely on signals from prior foreign investments as they have limited knowledge about the cost and benefits of the location choice especially for foreign investors. Furthermore, as we expected, the significant positive coefficient indicates that greenfield FDI is more reliant on signals than acquisition FDI. The reason for this is that greenfield investments need to build a new plant from ground zero. Thus, they carry more risk and uncertainty than acquisition investments.

Apart from three agglomeration-connected determinants, we do not observe any significance for the coefficients of wage variation, bureaucracy, and financial market development in the Model (1) of Table 4-9. This suggests that the differences in the effects of these variables between the two modes of investment are not statistically significant. To summarize, our results indicate that demand-side agglomeration, the number of firms and number of foreign incumbents play statistically significant different roles in the expansion of greenfield foreign investments versus foreign acquired plants. We also have a robustness check with consideration of the proximity

into agglomeration effects, results are qualitatively the same in Table 4-10.

Table 4-9: The Relative Importance of Location Determinants with respect to Greenfield FDI over Acquisition FDI

	Dependent variable: the ratio of number of greenfield/number of acquisition				
	(1)	(2)	(3)	(4)	(5)
			OLS		
Demand-side agglomeration	0.0122*		0.0211***	0.0169*	0.0327***
	(1.79)		(2.79)	(1.76)	(4.63)
Number of firms	-0.0499***	-0.0624***		-0.0579***	-0.0607***
	(-2.54)	(-4.49)		(-3.14)	(-4.33)
Stock of foreign Plants	0.0694***	0.0388***	0.0385***		0.0334***
	(5.58)	(4.07)	(4.12)		(3.36)
Wage variation	-0.0353	-0.0624*	-0.0434*	-0.0248	-0.0567*
	(-1.45)	(-2.54)	(-1.84)	(-0.96)	(-2.36)
Bureaucracy	-0.00315	-0.0515	-0.0616	-0.0614	
	(-0.12)	(-0.08)	(-0.64)	(-0.66)	
Financial Development	0.0472	0.0111	-0.0150	-0.0148	
	(0.63)	(0.63)	(-0.89)	(-0.96)	
Year Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Province Dummy	Yes	Yes	Yes	Yes	Yes
_cons	-0.00551	-0.176*	0.154	0.254*	-0.142
	(-0.03)	(-1.77)	(1.45)	(1.89)	(-1.45)
N	2067	2041	2041	2041	2067

Note: The dependent variable is ratio of the number of greenfield firms over the number of firms acquired by foreign investors in each province and in each sector at a certain year. Model specification is OLS. *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4-10: The Relative Importance of Location Determinants respect to Greenfield FDI over Acquisition FDI

	Dependent variable: the ratio of number of greenfield/number of acquisition				
	(1)	(2)	(3)	(4)	(5)
			OLS		
Demand-side agglomeration	0.0214***		0.0213***	0.0180***	0.0115*
	(2.14)		(2.88)	(2.34)	(1.94)
Number of firms	-0.0236*	-0.0358***		-0.0342***	-0.0342***
	(-1.76)	(-3.19)		(-2.90)	(-3.04)
Stock of foreign Plants	0.0281***	0.0189*	0.0229***		0.0182*
	(2.97)	(2.35)	(2.91)		(2.22)
Wage variation	-0.0448	-0.0239	-0.0399*	-0.0166	-0.0226
	(-1.63)	(-1.04)	(-1.82)	(-0.72)	(-1.02)
Bureaucracy	0.00119	-0.0428	-0.0548	-0.0527	
	(0.05)	(-0.07)	(-0.04)	(-0.03)	
Financial Development	0.0754	0.0371	-0.00898	-0.00658	
	(1.10)	(0.80)	(-0.68)	(-0.46)	
Year Dummy	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Province Dummy	Yes	Yes	Yes	Yes	Yes
_cons	-0.318*	0.0637	-0.0704	0.000961	0.0860
	(-2.01)	(0.63)	(-0.72)	(0.01)	(0.86)
N	2114	2114	2114	2114	2140

Note: The dependent variable is ratio of the number of greenfield firms over the number of firms acquired by foreign investors in each province and in each sector at a certain year. Model specification is OLS. *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.4 Whether the dependence on external finance is important for location choice?

In this section, we examine how financial market development is important in the growth of the two modes of FDI in provinces of China. The conventional view is that a better financial market helps investments in the region. However, in the case of

foreign investment, foreign capital may act as a substitutive finance channel over local financial institutions. There has been a large literature focusing on the substitution relationship between local financial institutions and foreign capital. Some of them have pointed out that this relationship is significant if the local financial market is under-developed. In the case of China, for example, Huang (2003) claims that the high growth of FDI in China is a sign of the weakness of its financial system because local firms are not able to finance from local financial market. Embedding the substitution relationship into differences of two foreign investment modes, we expect that this relationship is not significant in greenfield FDI, but should have some effects on acquisition FDI. The reason is that greenfield projects are financed by foreign investors, whereas, acquisition projects take over assets of acquired firm which are related to local financial markets. In a previous discussion, we have found evidence in Table 4-5 and Table 4-7. However, our discussion has ignored industry characteristics. The purpose of this section is to investigate how financial markets have effects on greenfield FDI and acquisition FDI with a focus on industry financial dependence.

In our following investigations, we include an interaction term which is formed as industry financial dependence dummies multiplied by financial market development. Rajan and Zingales (1998) create the underlying 2-digit industry financial dependence data. It is measured by the fraction of capital expenditures that are not financed by cash flow from operations. The dummy equals 1 if the financial dependence of an industry is higher than the median and equals 0 otherwise. Results are shown in Table 4-11. Models (1) to (3) of our following discussion are based on

our benchmark specifications. Then, we include the relative position of the province to other regions into our analysis in models (4) to (6). The number of incumbents and the number of foreign firms are evidently co-linear right-hand side variables that raises a concern about the potential bias of the co-linearity has on the estimated effect of the financial development. Therefore, in each specification, we exclude the number of incumbents and the number of foreign firms which .

Table 4-11 shows results for the case of greenfield foreign investments. Consistent with our results in Table 4-5, we do not observe any significant coefficient on the financial market development and the interaction term. This shows that financial market development does not have a significant impact on location decisions of foreign greenfield investors whether or not the new plant will be highly dependent on the external finance. Our results confirm that greenfield foreign plants are generally financed by capital provided by foreign investors. Location financial institutions play a limited role in the expansion of greenfield foreign investments. Our results are robust if spatial proximity is considered in models (4) to (6).

Table 4-12 illustrates results for the determinants of acquisition FDI. We first focus on Model (1) that has the most control variables under our benchmark specification. We find a positive and statistically significant coefficient for the financial development variable. It shows that as a more developed financial market attracts more acquisition FDI in less financial dependent industries. Moreover, a negative coefficient of the interaction term may suggest that acquisition FDI in more external finance dependent industries are less affected by the positive effect of the

financial market development. However, the coefficient in Model (1) on the interaction term is not significant.

In Model (4) which is our most general model, we include geographic proximity and all dummy controls into our analysis. We not only find the coefficient of the financial market development is positive and significant, but also observe the coefficient of the interaction term is negative and statistically significant. In addition, the sum of two coefficient is positive (0.540+ (-0.0481)). Therefore, it is evident that financial market development is positively related to the number of acquisition FDI in general, while this relationship is significantly weaker in industries that are more dependent on external finances.

The result is consistent with the substitution role of acquisition FDI. Non-state-owned firms in China face discrimination from financial institutions in China. Those firms that are heavily dependent on external finance have to sell equity to foreign investors to increase their production capacity. Consequently, more available acquisition targets attract more acquisition FDI. This effect is opposite to the positive correlation between financial market development and number of acquisition foreign entries. Consequently, we find a negative coefficient on the interaction term. To summarize, our investigation implies that foreign capital is an important substitution source of finance for firms that rely on external finance in China, given that non-state-owned domestic firms have difficulties to raise finance from local financial institutions.

Table 4-11: Location Determinant of Greenfield FDI according to Different industrial financial dependency

	Dependent variable: the number of greenfield FDI					
	(1)	(2)	(3)	(4)	(5)	(6)
	Count model: Benchmark			Count model: Inclusion of proximity		
Financial development	0.105	0.161 *	-0.0203	0.470***	0.537***	-0.0119
	(1.40)	(1.89)	(-0.07)	(6.09)	(5.87)	(-0.04)
F-dependence*	-0.0500	-0.0312	-0.0392	-0.0627*	-0.0505	-0.0428
F-development	(-1.57)	(-0.47)	(-1.61)	(-1.76)	(-0.67)	(-1.57)
Demand-side	0.696***	0.728***	0.0849*	0.529***	0.578***	0.0462
agglomeration	(19.99)	(20.09)	(1.94)	(15.61)	(16.14)	(1.07)
Number of firms	-0.552***		-0.139**	-0.376***		0.0553
	(-11.99)		(-2.86)	(-7.30)		(0.97)
Stock of foreign	0.682***	0.633***		0.605***	0.509***	
Plants	(19.32)	(16.65)		(15.29)	(10.64)	
Wage variation	-0.741***	-0.336***	-0.0424	-0.291***	0.0581	0.142*
	(-8.94)	(-3.98)	(-0.56)	(-3.49)	(0.67)	(1.73)
Bureaucracy	-0.272***	-0.231***	-0.118***	-0.231***	-0.183***	-0.108*
	(-8.78)	(-7.78)	(-3.03)	(-6.93)	(-5.69)	(-2.48)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Province dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cons	-5.541***	-5.584*	4.100	-4.670***	-5.179***	1.933
	(-4.72)	(-2.19)	(0.44)	(-5.71)	(-4.13)	(0.51)
ln_r						
Cons	4.179***	5.446*	10.06	3.423***	4.141***	5.756
	(4.57)	(2.40)	(1.10)	(6.08)	(4.26)	(1.60)
ln_s						
Cons	0.850***	1.395***	2.442***	0.426***	0.818***	1.115***
	(6.21)	(7.43)	(10.87)	(3.80)	(5.52)	(7.51)
N	2543	2543	2543	3398	3398	3398

Note: The dependent variable is the number of greenfield plants invested by foreign investors in each province and in each sector at a certain year. Model specification is the negative binomial model with random effects. *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The ln_r and ln_r lines refer to ln(r) and ln(s), where the inverse of one plus the dispersion is assumed to follow a Beta (r,s) distribution.

Table 4-12: Location Determinant of Acquisition FDI according to Different Financial Dependency

	Dependent variable: the number of foreign acquisitions					
	(1)	(2)	(3)	(4)	(5)	(6)
	Count model: Benchmark			Count model: Inclusion of proximity		
Financial development	0.237***	0.135***	0.271*	0.540***	0.410***	0.316***
	(5.77)	(3.00)	(2.18)	(12.47)	(8.28)	(2.27)
F-dependence* F-development	-0.0326	-0.117	-0.0169	-0.0481***	-0.112***	-0.0456***
	(-1.63)	(-1.01)	(-1.43)	(-2.12)	(-2.49)	(-3.13)
Demand-side agglomeration	0.659***	0.762***	0.0488*	0.502***	0.628***	0.00415
	(32.12)	(37.37)	(2.46)	(24.34)	(28.89)	(0.20)
Number of firms	-0.274***		0.223***	-0.154***		0.295***
	(-10.19)		(9.66)	(-5.15)		(11.12)
Stock of foreign Plants	0.549***	0.531***		0.540***	0.492***	
	(27.27)	(25.65)		(24.38)	(18.42)	
Wage variation	-0.702***	-0.404***	-0.148***	-0.283***	-0.0425	0.00922
	(-14.42)	(-8.48)	(-4.29)	(-5.60)	(-0.82)	(0.24)
Bureaucracy	0.0743***	0.114***	-0.0149	0.0791***	0.112***	0.000425
	(3.58)	(5.64)	(-0.67)	(3.57)	(5.28)	(0.02)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Province dummy	Yes	Yes	Yes	Yes	Yes	Yes
Cons	-5.146***	-7.093***	1.532	-5.023***	-6.576***	-0.165
	(-8.26)	(-11.58)	(1.17)	(-15.05)	(-15.48)	(-0.46)
ln_r						
Cons	3.817***	4.100***	6.058***	2.538***	3.086***	3.505***
	(7.12)	(8.65)	(5.12)	(14.20)	(11.50)	(31.46)
ln_s						
Cons	1.013***	1.464***	2.648***	0.841***	1.058***	2.362***
	(15.30)	(19.96)	(23.92)	(12.50)	(14.76)	(22.77)
N	2543	2543	2543	3398	3398	3398

Note: The dependent variable is the number of firms acquired by foreign investors in each province and in each sector at a certain year. Model specification is the negative binomial model with random effects. *t* statistics are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The ln_r and ln_r lines refer to ln(r) and ln(s), where the inverse of one plus the dispersion is assumed to follow a Beta (r,s) distribution.

6 Conclusions

There is a large theoretical and empirical literature on the location determinants of FDI, which has accompanied the rapid growth of multinational activities in the last few decades. However, the majority of this literature has yet to recognise that the effects of location determinants are different for greenfield FDI and acquisition FDI. In this paper, we investigate location determinants on the two investment modes in 31 Chinese provinces over the period from 2000 to 2005 using a negative binomial model. We contribute to the literature in a four other ways. First, to the best of our knowledge, our study is the first of its kind comparing location determinants on greenfield FDI versus acquisition FDI in China, which is the second largest FDI recipient in the world (second only to the US). Second, unlike the use of macro-level data in previous studies, we employ a comprehensive firm-level dataset to identify the number of the two modes of FDI entries and construct dependent variables. Third, our empirical approach is interesting as we mainly focus on agglomeration effects which are motivated from the new economics geography theory. Furthermore, we also carry out an examination of how financial market developments have an effect on the two modes of FDI entries. Our findings are broadly consistent with expectations in the literature.

From an agglomeration perspective, first, we find that the size of a region's potential market as approximated by province-industry output has a positive but small effect in attracting both modes of FDI inflows. This effect is marginally higher in greenfield FDI. It is explained that acquisition FDI takes over the existing market

share of the acquired firm which is not available to greenfield investment. Second, we find the number of incumbents of an industry acts as a centrifugal force that pushes greenfield FDI away, while it acts as an attraction force for foreign acquisition. Indeed, greenfield investments are probably more subject to competition effects and acquisition investments benefit from the procurement opportunities of a cluster of firms. The result implies that a rapid growth of acquisition FDI in recent years can be explained by strong procurement effect in China. Third, we also find a stock of FDI has a positive effect in attracting both FDI investment modes, and this effect is larger in the case of greenfield FDI. It is because greenfield foreign investments are intrinsically riskier than acquisition FDI projects. They are more reliant on signals that are explained by the number of existing foreign plants in the region.

We also have investigated how financial market development affects the location decision of FDI in China. We do not find it has significant effect in attracting greenfield FDI. However, we show better financial market development encourages acquisition FDI. Furthermore, we observe that this effect is smaller in more financial dependent industries. The result is consistent with arguments in our previous chapter. Because of severe discrimination faced by non- state-owned firms from local financial institutions, more external-finance dependent firms have to sell their equities to foreign investor to finance their production potential. This substitution relationship offsets the positive effect of financial market development on growth of acquisition FDI in China.

Our research provides an understanding of location characteristics that affect the

entry of greenfield FDI and acquisition FDI. It is an important step toward further investigations on the different consequences and implications of the two modes of FDI in the host location.

CHAPTER 5: Conclusions

1 Summary of findings

Since acquisition FDI has dominated FDI inflows in China in recent years. This thesis starts with a study on foreign acquired firms in China. In Chapter 2, we explore the determinants of foreign acquisition and the ownership mode of acquisition in China, with a special focus on regional institution quality and pre-acquisition firm heterogeneity. The main dataset we employ is a very comprehensive Chinese firm-level data covering 31 Chinese provinces in the period of 2000 to 2005. The methodology we have applied is the binary choice logit model that estimates the likelihood of domestic firms being acquired by foreign investors. In our discussion, we explicitly distinguish fully foreign acquired and partially foreign acquired firms, providing the first evidence of its kind on China.

Four interesting results stand out. First, we find that better institutional environment has a positive impact on the incidence of foreign acquisition in China. Furthermore, this impact is stronger in capital-intensive and R&D intensive industries. Our findings are consistent with current literature which is mainly based on aggregate cross-country investigations. Secondly, we find that in capital-intensive industries, better institution decrease the probability of domestic firms being wholly acquired. This finding is consistent with prediction of transaction cost theory. Thirdly, we confirm that acquisition FDI in China tends to take over domestic firms that are more productive and capital intensive. This is an evidence of 'cherry-picking' of acquisition

activity. We also find that more export intensive firms are significantly more likely to be acquired by multinationals, indicating a reflection of export-oriented acquisition FDI in China. Finally, conditional on foreign acquisition norms, domestic firms are more likely to be wholly acquired if they are smaller, younger, more capital-intensive, more export-intensive, and less productive. It is a supplementary result to the literature which suggests that more efficient parent firms prefer wholly owned affiliates.

Although it is perceived that FDI in China are mainly export-oriented and we find evidence that more export intensive firms are more likely to be acquired by foreign investors, two questions remain: 1) whether acquisition FDI increases the export performance in the post-acquisition period, and 2) if so, whether the host country benefits from export-orientated FDI. We take up these research questions into Chapter 4, where we use propensity score and difference-in-difference methods to deal with causality issue and any time-invariant effects.

A few important findings can be summarized. First, we find that acquisition FDI induces an increase of export intensity of the acquired exporter. We also show that acquisition FDI increases the likelihood of exporting by the acquired firm (which was a non-exporter before acquisition) compared to similar firms that have never been acquired. Our findings suggest that export-orientated acquisition FDI in China not only prefers exporting local firms but also enhance their export performance in the post acquisition period. Second, we do not observe any FDI-induced productivity upgrade in the acquired firm. This finding is a supplement to some existing literature

that finds positive inter-firm productivity spillover from foreign investment. One explanation could be that only a small share of FDI in China comes from developed countries. In fact, Hong Kong and Taiwan sourced FDI takes a lion share of 60 percent of the accumulated FDI inflows in 2002. FDI from the U.S. only takes less than 9 percent. Third, we find there is a significant improvement in the financial status of the acquired firm in the post-acquisition period, compared to similar firms remaining domestic. Our finding is consistent with the argument that acquisition FDI plays a substitution role if the financial market of the host location is under-developed.

Having understood the determinants and impacts of acquisition FDI in China, we turn our focus on greenfield FDI which is also growing fast. In Chapter 4, we apply a negative binomial model to evaluate how regional characteristics determine the attractiveness on greenfield FDI compared with acquisition FDI. Inspired by the new economic geography theory, we focus on the effects of agglomeration on FDI activity in a region. Some most interesting results are summarized here. Firstly, we find that greenfield FDI is diverted away from clusters of establishments of an industry in the same region because the (congestion-like) competition effect dominates. However, acquisition FDI is encouraged by a higher concentration of firms of an industry in a region, indicating that the procurement opportunities have a strong effect on acquisition FDI in China. Second, we find that industry-region specific FDI stock has positive effect on attracting foreign investors, and this effect is stronger for greenfield investors. It implies greenfield FDI, which is a riskier investment strategy, is more

dependent on the signal reflecting investing environment of existing foreign investments. Last, but not the least, we find financial market development does not affect greenfield investment significantly, since greenfield project is directly financed by foreign investor. Furthermore, we find a better financial market encourages acquisition FDI, since to acquire a local asset involves local financial institutions. Interestingly, this effect is significantly lower in high external financial dependent industries. In fact, private firms that depend highly on external finance but face discrimination from local financial institutions have to seek capital from foreign investors by selling equity. This effect offsets the positive effect of financial market improvement on acquisition FDI.

2 Future research

There are still limitations facing this study in understanding inward FDI in a developing economy, which motivate future researches in mainly three aspects.

First, a limited literature has evaluated whether greenfield FDI and acquisition FDI have different impacts on the host economy, especially based on micro-level analysis. In discussion on the determinants of greenfield FDI and acquisition FDI, Görg (2000) shows that more technologically advanced multinationals prefer greenfield investment due to the higher adaption costs they will incur in acquisition. Nocke and Yeaple (2008) shows that more productive firms tend to establish a new plant in a host location rather than acquire an existing one, using a binary model on U.S. multinationals. Therefore, it is interesting to assess whether these findings

predict a host economy benefits from productivity spill-over more from greenfield FDI than acquisition FDI?

Second, although we have not identified the factor accounting for the FDI-induced export increase, there are other potential factors may attract attention if data is available. Rauch (1999) points out that international trade has been increasingly dependent on the transmission of complex information. Therefore, one would expect that foreign investors who possess a wide network in the global market can facilitate an increase in export performance in the post acquisition period. We could provide empirical evidence to support this hypothesis if we had data indicating export reliance on information provided by foreign investors.

Third, like the most of current studies, we consider ownership modes and investment modes as discrete choices of multinationals. Empirical investigation on the determinants of modes of FDI with a joint consideration is scarce. A recent study by Raff *et al*. (2012) jointly estimates both ownership modes and investment modes of FDI entries with a nested logit model using Japanese firm-level data, in which a sequence of decisions is arbitrarily assigned. In fact, both ownership modes and investment modes are explained by similar firm-specific and host location-specific determinants in theory. It would possibly mean that these factors affect all modes of entries at the same time. Therefore, a multinational firm considers all entry alternatives in its profit optimisation problem. Following this direction, we would investigate how location characteristics have effects on all four modes of foreign entry in a host economy, namely greenfield joint venture, greenfield wholly foreign owned

firm, acquired joint venture, and acquired wholly foreign owned firm.

Appendix A

Table A1. Number of Acquisitions

year	Non-acquired	Acquired	Total	Partially acquired	Fully acquired	Total
2001	103,668	1,636	105,304	931	705	1,636
2002	124,401	1,899	126,300	1,091	808	1,899
2003	129,504	1,743	131,247	994	749	1,743
2004	123,020	3,711	126,731	1,740	1,971	3,711
2005	198,744	4,075	202,819	1,852	2,223	4,075
Total	679,337	13,064	692,401	6,608	6,456	13,064

Table A2. Robustness Check: Logit Model of Acquisition: Continuous Industry Variables

	Dependent Variable: For all Firms: Acquired firm=1&Domestic firm=0			
	(i)	(ii)	(iii)	(iv)
Regional Institutions	0.00148***	0.00107**	0.00702***	0.00644***
	-0.00043	-0.0004	-0.00054	-0.00054
Foreign Presence	0.00460***	0.00442***	0.00319***	0.00248***
	-0.00019	-0.00018	-0.00017	-0.00016
Average Wages	0.00315***		0.00302***	
	-0.00047		-0.00042	
Regional GDP per Capita	0.00897***	0.01012***		
	-0.0006	-0.00053		
Firm Export Share	0.00878***	0.00830***	0.00883***	0.00813***
	-0.00199	-0.00193	-0.00201	-0.00198
Firm Employment	0.00432***	0.00404***	0.00362***	0.00334***
	-0.00025	-0.00024	-0.00024	-0.00022
Firm Labour productivity	0.00240***	0.00215***	0.00176***	0.00178***
	-0.00015	-0.00015	-0.00014	-0.00014
Firm K/L Ratio	0.00321***	0.00308***	0.00307***	0.00308***
	-0.00013	-0.00012	-0.00011	-0.00011
Firm Age	-0.00064***	-0.00065***	-0.00063***	-0.00060***
	-0.00002	-0.00002	-0.00002	-0.00002
Indu. K-intensity				0.00173***
				-0.00046
Indu. R&D intensity				0.00039*
				-0.00018
Year Dummy	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	No
N	474,482	474,482	474,482	474,482

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Independent variables are logged except export share and all dummies.

Table A3. Robustness Check: Logit Model of Acquisition with Interaction Terms: Continuous Industry Variables

	Dependent Variable: For all Firms: Acquired firm=1&Domestic firm=0			
	(i)	(ii)	(iii)	(iv)
Regional Institutions	0.00290**		0.00993***	
	-0.00108		-0.00085	
(Indu. KL)*(Region Institution)	0.00083***	0.00077***		
	-0.00023	-0.00023		
(Indu. R&D)*(Region Institution)			0.00031***	0.00028***
			-0.00006	-0.00006
Foreign Presence	0.00239***	0.00236***	0.00240***	0.00246***
	-0.00016	-0.00016	-0.00016	-0.00016
Average Wages	0.00356***	0.00346***	0.00335***	0.00235***
	-0.00041	-0.00041	-0.00041	-0.00041
Regional GDP per Capita	-0.02606***	-0.02453***	-0.02679***	-0.02576***
	-0.0032	-0.0032	-0.00318	-0.00318
Firm Export Share	0.00812***	0.00768***	0.00809***	0.00813***
	-0.00197	-0.00197	-0.00197	-0.00197
Firm Employment	0.00333***	0.00343***	0.00323***	0.00336***
	-0.00022	-0.00022	-0.00022	-0.00022
Firm Labour productivity	0.00175***	0.00174***	0.00176***	0.00177***
	-0.00014	-0.00014	-0.00014	-0.00014
Firm K/L Ratio	0.00305***	0.00302***	0.00305**	0.00306***
	-0.00011	-0.00011	-0.00011	-0.00011
Firm Age	-0.00060***	-0.00060***	-0.00060***	-0.00060***
	-0.00002	-0.00002	-0.00002	-0.00002
Year Dummy	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Year*Region Dummy	No	Yes	No	Yes
N	474,469	474,469	474,469	474,469

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Independent variables are logged except export share and all dummies.

Table A4. Robustness Check for Mode of Acquisition: Continuous Industry Variables

	Dependent Variable: For all Acquired Firms: WOEs=1&JVs=0			
	(i)	(ii)	(iii)	(iv)
Regional Institutions	0.17044***	0.16565***	-0.00416	-0.00706
	-0.01167	-0.01182	-0.02514	-0.02535
Foreign Presence	0.00299	0.00282	0.0008	-0.0054
	-0.00539	-0.00543	-0.00578	-0.0061
Average Wages	0.01001		-0.04511*	
	-0.01691		-0.01835	
Regional GDP per Capita	-0.04773*	-0.02979		
	-0.01879	-0.02043		
Firm Export Share	0.10995***	0.11081***	0.10733***	0.09816***
	-0.0129	-0.01295	-0.01392	-0.01411
Firm Employment	-0.00475	-0.00484	-0.01347*	-0.01667**
	-0.00492	-0.00493	-0.0053	-0.00546
Firm Labour productivity	-0.02520***	-0.02579***	-0.02542***	-0.02417***
	-0.0052	-0.00521	-0.00556	-0.00564
Firm K/L Ratio	0.01108*	0.01073*	0.01360**	0.01657***
	-0.00431	-0.00431	-0.00449	-0.00459
Firm Age	-0.01510***	-0.01529***	-0.01662***	-0.01651***
	-0.00129	-0.00131	-0.00155	-0.00157
Indu. K-intensity				-0.01807
				-0.01361
Indu. R&D intensity				-0.002
				-0.00811
Year Dummy	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	No
N	10,829	10,829	10,825	10,822

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Independent variables are logged except export share and all dummies.

Table A5. Robustness Check: Logit Model of Acquisition with Interaction Terms: Marginal Effects, Continuous Industry Variables

	Dependent Variable: For all Acquired Firms: WOEs=1&JVs=0			
	(i)	(ii)	(iii)	(iv)
Regional Institutions	0.11498*		0.01265	
	-0.04757		-0.03832	
(Indu. KL)*(Region	-0.02913**	-0.03326**		
Institution)	-0.00964	-0.01033		
(Indu. R&D)*(Region			0.00155	0.00033
Institution)			-0.00246	-0.0025
Foreign Presence	-0.00342	-0.00449	-0.00645	-0.0066
	-0.00614	-0.0063	-0.00613	-0.00629
Average Wages	-0.04760*	-0.04537*	-0.03574	-0.05152**
	-0.01881	-0.01985	-0.01897	-0.01987
Regional GDP per Capita	0.22712		0.23619	
	-0.17095		-0.17031	
Firm Export Share	0.09849***	0.09681***	0.09755***	0.09582***
	-0.01418	-0.01422	-0.01409	-0.01412
Firm Employment	-0.01714**	-0.01787**	-0.01652**	-0.01735**
	-0.00545	-0.0055	-0.00547	-0.00552
Firm Labour productivity	-0.02414***	-0.02455***	-0.02423***	-0.02429***
	-0.00564	-0.00578	-0.00564	-0.00578
Firm K/L Ratio	0.01672***	0.01757***	0.01635***	0.01731***
	-0.00459	-0.00466	-0.00458	-0.00465
Firm Age	-0.01643***	-0.01677***	-0.01650***	-0.01684***
	-0.00157	-0.00157	-0.00157	-0.00157
Year Dummy	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Year*Region Dummy	No	Yes	No	Yes
N	474,469	474,469	474,469	474,469

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Independent variables are logged except export share and all dummies.

Table A6. Robustness Check for Mode of Acquisition: Different Equity Thresholds for Defining Foreign Enterprises: Marginal Effects

	Dependent Variable: For all Acquired Firms: acquired firm=1&Domestic firm=0		
	(1)	(2)	(3)
	Foreign equity ≥ 10%	Foreign equity ≥ 50%	Foreign equity ≥ 75%
Regional Institutions	0.00144***	0.00147***	0.00166***
	(0.98)	(1.18)	(1.00)
Foreign Presence	0.00296***	0.00233***	0.00222***
	(0.0024)	(0.0027)	(0.0027)
Average Wages	0.0541***	0.0901*	0.210***
	(0.0032)	(0.0031)	(0.0031)
Regional GDP per Capita	-0.0991**	-0.0588***	-0.163***
	(0.0023)	(0.0073)	(-0.0003)
Firm Export Share	0.00848***	0.00829***	0.00892***
	(0.0018)	(0.0017)	(0.0015)
Firm Employment	0.00431***	0.00404***	0.00362***
	(0.0003)	(0.0005)	(0.0009)
Firm Labour productivity	0.00248***	0.00223***	0.00179***
	(0.000)	(0.00015)	(0.00014)
Firm K/L Ratio	0.00309***	0.00301***	0.00318***
	(0.000)	(0.00012)	(0.00011)
Firm Age	-0.00064***	-0.00065***	-0.00063***
	(0.000)	(-0.00002)	(-0.00002)
Indu. K/L Ratio	0.0007	0.0009	0.00001
	(-0.00046)	(-0.00056)	(-0.00051)
Indu. R&D intensity dummy	-0.00034	-0.00056	0.00065**
	(-0.00031)	(-0.0003)	(0.00032)
Year Dummy	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes
Industry Dummy	No	No	No
Constant	-1.440***	-1.339***	-0.0409
	(-4.83)	(-4.48)	(-0.13)
Observation	474,482	474,482	474,482

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Independent variables are logged except export share and all dummies.

Table A7. Robustness Check for Mode of Acquisition: Different Equity Thresholds for Defining Joint Ventures and Wholly Owned Foreign Enterprises: Marginal effects

	Dependent Variable: For all Acquired Firms: WOEs=1&JVs=0		
	(1)	(2)	(3)
	Foreign equity ≥ 10%	Foreign equity ≥ 50%	Foreign equity ≥ 75%
Regional Institutions	-0.00252***	-0.00352***	-0.00402***
	(0.00157)	（0.00172）	（0.00162）
Foreign Presence	-0.00443	-0.00558	-0.00647
	(0.0060)	(0.00508)	(0.00602)
Average Wages	-0.02049	-0.03331	-0.04242
	(0.01724)	(0.01863)	（0.01856）
Regional GDP per Capita	0.26345	0.25541	0.34151
	(0.17261)	(0.17245)	（0.19384）
Firm Export Share	0.08350***	0.10359***	0.10412***
	(0.01406)	(0.01405)	(0.01405)
Firm Employment	-0.01625**	-0.01624***	-0.01636**
	(0.00546)	(0.00546)	(0.00546)
Firm Labour productivity	-0.02436***	-0.02463***	-0.02502***
	(0.00565)	(0.00564)	(0.00564)
Firm K/L Ratio	0.01565***	0.01664***	0.01514***
	(0.00457)	(0.00454)	(0.00457)
Firm Age	-0.01660***	-0.01661***	-0.01662***
	(0.00157)	(0.00159)	(0.00157)
Indu. K/L Ratio	-0.04756***	-0.04759***	-0.04734***
	(0.01239)	(0.01239)	(0.01239)
Indu. R&D intensity dummy	0.03923**	0.03976**	0.03945**
	(0.01322)	(0.01322)	(0.01322)
Year Dummy	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes
Industry Dummy	No	No	No
Constant	-1.440***	-1.339***	-0.0409
	(-4.83)	(-4.48)	(-0.13)
Observation	13,769	9567	7256

Note. *Clustered standard errors* in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Independent variables are logged except export share and all dummies.

Appendix B

The balancing test examines the standardised differences for the vector of covariates used in the propensity-score estimation. According to Smith and Todd (2005), the standardised bias is defined as the difference in means of a variable between the foreign-acquired firms and the successfully matched control firms, scaled by the average variances of the variable. Given N acquired firms, it is given as

$$\mathrm{SD} = \frac{100\frac{1}{\mathrm{n}}\sum_{\mathrm{i}\in\mathrm{T}}\left[\mathrm{X_i} - \sum_{\mathrm{j}\in\mathrm{C}} \mathrm{g}(\mathrm{p_i}, \mathrm{p_j})\mathrm{X_j}\right]}{\sqrt{\frac{\mathrm{Var_{i\in T}(X)} + \mathrm{Var_{j\in C}(X)}}{2}}}$$

where $\mathrm{X_i}$ is the mean in the treatment group before matching and $\mathrm{X_j}$ the analogue for the control group. $\mathrm{Var_{i\in T}(X)}$ is the variance in the treatment group before matching and $\mathrm{Var_{j\in C}}$ is the variance for the control group.

Note that the lower the standardised differences, the more balanced or similar the treatment and comparison groups will be in terms of the variable under consideration. Although there is no formal criterion about how large a standardised bias should be considered as serious, we are guided by the work of Rosenbaum and Rubin (1985) which suggests that a value of 20 is large. Furthermore, we report a t-test between acquired and matched comparison groups. In general, we find that balancing conditions are satisfied for key variables.

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