Foreign Direct Investment in China: Determinants and Impacts

Submitted by

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I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

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Abstract

China has experienced high foreign direct investment (FDI) inflows for the past 30 years since it opened its door to foreign investors especially after the early 1990s. As a result, with more and more foreign invested enterprises in China, China has experienced dramatic changes in its economy and society. This study conducts an empirical analysis on the determinants of FDI regional and sectoral distribution in China and evaluates the impact of FDI on Chinese domestic investment. The dataset used for this study spans from 1990-2008 and involves both regional-level and sector-level data in China. The key findings of this thesis can be summarised into four points. First, on regional level, foreign investors base their investment decisions by tax rates, geography, labour costs and market size. Moreover, tax incentive effects are proved to be greater in the eastern areas than in the western areas. Second, at sectoral level, foreign investors are affected market size, employment, wage rate, exchange rate and state ownership degree, but not by the level of openness degree. Third, FDI has a significant crowding out effects on domestic investment on national level and in particular the eastern area, but has a crowding in effect in the middle area and no effect for the western area. Fourth, there is no significant evidence that FDI crowds out domestic investment on individual sector level. This study provides some valuable insights into foreign investors' decision making and the economic costs/benefits of FDI, which have important implications for scholars, practitioners and policy makers alike.

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CHAPTER 1
Introduction

1.1. Background and Motivation

China has experienced remarkable changes over the recent 30 years since the announcement of the 'Opening-up and Reform' policy in 1978. Since then, the Chinese Government has opened the markets gradually to overseas investment and achieved extraordinary success in attracting foreign direct investment (FDI) over the past 30 years. FDI in China has evolved from an almost negligible level in 1978 to about USD95 billion in 2008. Until 2008, there are 434,937 foreign enterprises registered in China[1]. Foreign firms, either solely-owned or as joint ventures with Chinese firms, have established a ubiquitous presence in China. Except those recorded in national statistics, Chinese people could easily feel the changes in their daily life. In 1990, the first MacDonald's was just established in Shenzhen, and in the next twenty years, MacDonald's has expanded to over 1,000 restaurants in China[2]. Other prominent examples of the impact of foreign products on the Chinese market include the dominant position of Coca-Cola and Pepsi in China's soft drink market, the oligopoly by Nokia, Ericsson, and Motorola (and of course, Apple in the latest few years) in China's cellular phone market, and the fact that the largest three supermarkets in China are all foreign: Wal-mart, Carrefour and Metro. Those phenomena suggest that Chinese people's traditional life style has been gradually changed by increasing FDI inflows.

Not only in China but also other countries worldwide, multi-national enterprises' (MNEs) international behaviours have played a critical role in promoting and shaping the patterns of economic development by cross-national interflowing of goods, capital, and technology (Dunning, 2003). Those MNEs' activities are strongly affected by their FDI decisions. In the past 30 years, FDI has gradually exceeded other international trade transactions and become the major economic transaction in the world (Graham and Krugman 1993). The rapid growth of FDI in many economies in the last three decades has attracted scholars' interest in both theoretical and empirical areas. Many studies have focused on MNEs or FDI inflows to investigate FDI investment decisions and the

[1] Statistic Yearbook of China, 2009.
[2] World business report (2009), "the development of MacDonald's in China" (http://biz.icxo.com/).

relationship between FDI and the host country's economy (Slemrod, 1990; Coughlin et al., 1991). However, research on FDI is still limited in the academic literature, and most previous studies on FDI decisions are limited to developed countries, such as the United States and countries from the European Union (Helpman, 1984; Hartman, 1984; Friedman, Gerlowski and Silberman, 1992; Hines 1996) with few in-depth studies on the determinants that drive FDI into emerging economies, such as China and India. Dunning (2003) also suggest that empirical studies on FDI and its determinants need to be explored over time, especially in emerging countries like China. From a research perspective, China is especially important because of its great success in attracting FDI with the change of FDI incentive policies since the 1990s. Moreover, the dynamic Chinese market offers rich research opportunities for empirical tests of environmental, structural, and organisational determinants of investment choices.

Specifically, this study stems from the following three motivations:

1. The role of FDI in the global economy is becoming increasingly important, leading to ever greater focus on the drivers of FDI in the recent twenty years. China's great success in attracting FDI under a series of policies since 1978 especially the establishment of dual capital income tax system, which gives larger concessionary tax benefits to foreign invested enterprises (from 1992 to 2008), makes it a good example for FDI research.
2. There are many gaps in the current literature on FDI in China:
    a) Most previous studies were focused on FDI inflows in the eastern areas (thus more developed areas) of China, whereas research on the western areas (less developed areas) especially the tax incentive differences between the two regions is limited. This has led to the need to investigate how different determinants affect FDI decisions between the eastern and western areas.
    b) There has been limited research so far on the determinants of sector choice by foreign investors. However, it is obvious that the factors that determine the investment decision in one sector may have no implication on the decision to invest in a different sector. Because of the seriously unbalanced industry distribution of FDI in China, this is an interesting research area that has not drawn enough attention previously.
    c) China has introduced a dual tax system for more than twenty years when different income tax rates are applied to foreign investment and domestic investment, with foreign investment having more favourable tax rates than

domestic investment. Whether these tax incentives and rapidly increasing FDI substitute for, and therefore 'crowd out', other investments in China remains unanswered. On the other hand, considerable work has been done on the crowding out effect of government interventions in other areas of the market such as venture capital (e.g., Cumming and MacIntosh, 2006).

3. The findings from this study will provide valuable information on foreign investors' decision making when they plan to invest in China, as well as significant implications for policy makers regarding FDI.

1.2. Aims and objectives

The aim of this thesis is to empirically examine the determinants of FDI distribution in China and evaluate the impact of FDI on Chinese domestic investment. This aim will be researched by the following objectives:

1. To investigate what factors significantly affect foreign direct investment location distribution in China using city-level data from 1990 to 2007.
2. To investigate the factors that determine FDI sector investment choice in the Chinese market using data on 14 sectors data from 1991 to 2008.
3. To investigate whether or not increasing FDI inflows in China since 1990s have any displacement effects (i.e. crowding in or crowding out) on China's domestic investment between 1990 and 2008.

Those three objectives will be investigated through three independent but related chapters (Chapter 5, 6, and 7). Furthermore, this thesis makes significant contributions to the empirical studies of distributions and determinants of FDI inflows and impacts of FDI in China as well. Compared to previous literature, this study applies new techniques and datasets to China's FDI analysis. Specifically, it is among the first studies to investigate sector distribution determinants of FDI in China and FDI displacement effects on both regional and industry level in China. The other specific contributions of this thesis will be discussed in the following research chapters or in the conclusion chapter.

1.3. Thesis Structure

The thesis is structured as follows:

Chapter 2 presents a more detailed introduction of the background of FDI development and the change of FDI policies in China. Section 2.1 gives an overview of FDI in China. Section 2.2 lays out in details the history, the changes and the current features of FDI policies in different stages. Section 2.3 discusses the key characteristics of FDI inflows in China from the following aspects: 1) the sources of capital, 2) sector distribution of FDI, 3) regional distribution of FDI and 4) the forms of FDI. Section 2.4 briefly outlines the impact of FDI in China.

Chapter 3 is the literature review chapter that reviews the recent studies on FDI. Section 3.1 briefly introduces the mainstream research on the topic. Section 3.2 provides a comprehensive review of a series of related studies on FDI. In particular, Section 3.2.1 describes previous studies on FDI behaviours and taxation, which examine the effect of tax rates, tax policies and tax systems on FDI distributions and inflows. Section 3.2.2 discusses the main empirical findings for exchange rate effects on FDI inflows. Section 3.2.3 reviews literature on the relationship between labour costs and FDI. Section 3.2.4 looks at how market size influences FDI inflows. Section 3.2.5 is focused on studies that investigate the relationship between infrastructure and FDI inflows. Section 3.2.6 discusses previous studies on the effect of trade on FDI decisions. Section 3.3 concludes this chapter by summarising limitations in previous research and suggesting possible contributions of this thesis.

Chapter 4 is the research methodology chapter that discusses the research methodologies for this thesis. After a brief introduction of the chapter, Section 4.2 discusses in details the research objectives of this thesis. Section 4.3 describes the data sources and the characteristics of the database used in this study. Section 4.4 introduces the sample selection and sample design process for this study. Section 4.5 discusses the research approaches used to answer the research questions addressed in this study.

The three research objectives set out in the previous section are achieved by three independent research chapters as follows:

Chapter 5 investigates the determinants of geographic locations of FDI in China. Section 5.1 introduces the background, aims and structure of this chapter. Section 5.2 describes the concessionary income tax regime for foreign invested enterprises and the

development of the special tax incentive zones in China since early 1980s. Section 5.3 reviews related studies on tax incentives and FDI inflows. Section 5.4 generally introduces the basic theory of FDI location decisions and analyses the possible determinant of FDI regional distribution. Section 5.5 describes the data collection and sample statistics for this study, followed by a discussion of empirical methodologies. Section 5.6 sets out the research hypotheses and regression model specifications. Section 5.7 presents the results of empirical analyses for this study. Section 5.8 concludes this chapter.

Chapter 6 examines the determinants of sector choice by foreign investors when investing in China. Section 6.1 introduces the motivations and objectives of the chapter. Section 6.2 reviews the limited literature on FDI sector-level analysis, both theoretically and empirically. Section 6.3 describes the patterns of FDI sectoral composition and their impacts in China. Section 6.4 mainly discusses the hypotheses for this study and describes the model used for the regression analysis. Section 6.5 discusses the sources and sample selection process of the data used in this analysis, followed by a presentation of sample descriptive statistics. Section 6.6 reports the empirical results and Section 6.7 provides a summary of the whole chapter.

Chapter 7 concerns the displacement effect of FDI on domestic investment in China. Section 7.1 sets out in detail the aims and the research questions of the chapter. Section 7.2 reviews relevant literature on the relationship between foreign and domestic investment. Section 7.3 discusses in more detail the theory and model used to empirically test the possible FDI displacement effect in this study. Section 7.4 describes the selection of sample and data descriptives. Section 7.5 discusses the econometrical approaches used and reports the empirical results for both regional- and sector-level analyses. Section 7.6 concludes this chapter.

Chapter 8 presents concluding remarks for the whole thesis. Section 8.1 will summarise the empirical findings from three research chapters and point out the limitations for this study. Section 8.2 discusses the key contributions of this study. Section 8.3 recommends possible future research as extensions to this study.

CHAPTER 2

An Overview of the Development of Foreign Direct Investment in China

2.1. Introduction

China has experienced high FDI inflows for the past twenty years since it opened the door to foreign investors especially after the early 1990s. Attracting FDI is an important part of the 'opening up' and economic reform process which has been included into the basic state policies since 1978. In the last 30 years, FDI inflows in China have expanded from almost nil in the late 1970s to USD95 billion in the year of 2008[3]. Most of the FDI inflows occurred after 1992 which account for about 95% of the total FDI volume between 1979 and 2008. As a result, China has become the second largest recipient of FDI in the world and the largest FDI recipient among developing countries for many years in the 1990s[4]. With more and more foreign invested enterprises (FIEs) in China, China has also experienced dramatic changes in its economy and society. Consequently, China has transformed from a 'planned economy' to 'market-oriented economy' gradually and at the same time, its real GDP has grown at an average speed of 9.5% annually from 1978 to 2000[5].

This chapter will review the development of China's policies for foreign investors and the resulting changes brought to FDI inflows. Then, it will investigate the main characteristics and trends of FDI in China. Finally, the impacts of FDI inflows on China's economy during the reform era will be discussed.

There are three major forms of foreign capital utilized by China: foreign loans, foreign direct investment and other foreign investment. Foreign loans include loans from foreign governments, international financial organisations, foreign banks, bonds issued by foreign countries and so on. As pointed out by Huang (2003) [6], foreign investment is defined as 'direct' when the investment gives rise to 'foreign control' of domestic assets.

[3] Data from Chinese foreign invest statistics.
[4] Ministry of Finance (2004), http://www.mof.gov.cn/.
[5] Source: Statistical Yearbook of China.
[6] Whilst there are many different standard definitions for FDI, this paper adopts the one by Huang (2003) because of the more 'China-specific' nature of his definition.

In China, "foreign capital inflows (are) classified as FDI only if they lead to a foreign equity stake at or above 25%", which is a more strict definition than other countries for FDI and for corporate controls (for example, the US only requires more than 10% for foreign equity stake) [7]. Other foreign investment involve international leasing, compensation trade and processing, shares issued to foreigners and so on. Here, we shall mainly discuss foreign direct investment in China due to its crucial position and significant impacts on China's society.

This chapter proceeds as follows. Section 2.2 lays out in details the history, changes and current features of FDI policies in different stages. Section 2.3 discusses the key characteristics of FDI inflows in China from the following aspects: 1) the sources of capital, 2) sector distribution of FDI, 3) regional distribution of FDI and 4) the forms of FDI. Section 2.4 briefly outlines the impacts of FDI in China.

2.2. FDI Policies in China

Since the late 1970s, China has begun to introduce foreign investment and gradually opened its market to foreign investors. However, China's policies towards FDI have experienced dramatic changes from the start of the opening-up policy in the late 1970s to present. These changes can be divided into different stages, each of which has its own characteristics. This section will discuss the purpose of attracting FDI and trace the changes of China's policies on FDI overtime.

2.2.1. The purpose of attracting FDI

Attracting foreign investment is one of the fundamental objectives of China's opening-up policy and is also an important component of market-oriented economic reform. It is common to ask why the Chinese Government decided to open its door to the world and what the purpose is to attract FDI, after years of economic isolation from the rest of the world. The most direct answer is to develop the Chinese economy. In the late 1970s, the pattern of international relationships had undergone great changes, when FDI increased rapidly with international market integration and the trends of globalisation became more and more apparent. At this time, international investment was featured by capital outflows from developed countries into developing countries especially after the end of

[7] Huang (2003).

the cold war. Consequently, many developing countries have taken this opportunity to utilise FDI to develop their own economy.

Specifically, there are four reasons for Chinese government's interest in FDI. The first reason is to make up the capital shortage for economic construction. During the early years of 'opening-up', the per capita income and savings in China were in serious deficiency. In 1978, GDP per capita in China is only RMB381 (about USD226) and the total savings in the bank are only RMB21.06 billion (about USD12.8 billion)[8]. The low bank deposit limited the level of domestic investment and as a result, local enterprises' growth was highly constrained because of the lack of capital inflows. This situation seriously restricted the development of China's economy. Therefore, attracting foreign investment became necessary and essential to support China's economic development at that time.

Second, the introduction of advanced foreign technologies and experienced professional management is another purpose of China's FDI policies. The technology spillover of foreign investment is a good way to promote local technology innovations which has been enjoyed by many other countries[9]. Foreign investment can improve the technologies in host country through several ways, for example, competition by firms within the same industry, training of employees, information exchange between management, and vertical linkages with the suppliers and buyers in up and down stream industries.

Third, FDI is crucial in reducing the unemployment of the host country. With more and more foreign enterprises entering China, there is no doubt that they will provide significant employment opportunities for local residents.

Finally, attracting FDI is also an important component of the market-oriented economic reform in China. The inflows of FDI are likely to accelerate the progress of China's reform of economic system, as well as the upgrading of law and corporate managerial

[8] Renminbi (RMB) is the official Chinese currency. The exchange rate of RMB and other currency is shown in appendix B.
[9] Spillover means the effects of economic activity or process upon those who are not directly involved in it.

system in China. Those effects will promote China's transferring from a planned economy to a market-oriented economy.

2.2.2. Different forms of FDI in China

Before discussing the policies and regulations on FDI, it is necessary to understand the basic forms of FDI in China. There are five different forms of FDI in China, including equity joint ventures, contractual joint ventures, wholly foreign-owned enterprises, joint exploitations, and foreign-funded share-holding enterprises.

Equity joint ventures (EJVs) are also known as share-holding corporations. They have been set up in China with joint capital by foreign investors and domestic partners. EJVs normally take the form of limited liability companies where the joint partners invest and operate together, and share profits and losses on a pro-rata base. Particularly in China, the investment from foreign participation should not be lower than 25% which is a higher threshold than many other countries. EJV is the earliest form of FDI in China and has played a very important role in attracting foreign investment. From 1979 to 1982, EJVs accounted for about 8.4% of total FDI inflows in China. This figure rose rapidly which reached about 60% at the end of 1980s. They have experienced continuous decrease since 1990 as exclusively foreign-owned enterprises began to grow quickly. At present, they are still an important element of FDI inflows and make up around a third of the cumulative realized FDI in China.

Contractual joint ventures (CJVs), also called cooperate businesses, are established jointly by foreign investors and domestic participations. CJVs may or may not be formed as legal entities, and the investment can be contributed in the form of capital, land, technologies and so on. Unlike EJVs where profits and losses are shared proportionally, investors in a CJV share the profits and losses according to the terms and conditions in the contract. A typical CJV scenario in China is the foreign party supplies capital or technologies whilst the domestic party supplies land, labour, materials, factory buildings, etc. CJV has been the most important form of FDI inflows during the early years of opening up due to its low risk and flexible forms of cooperation. CJVs accounted for about 50% of all FDI inflows at the start of 1980s, decreased gradually after then, but still occupied about 12% of total FDI until 2007.

Wholly foreign-owned enterprises (WFEs) are firms solely invested by foreign investors such as foreign companies, enterprises, organisations, institutions or individuals. The foreign investors establish the companies in accordance with the laws of China, and "have to agree with at least one of the following criteria: the enterprises must adopt the international advanced technology and facility; all or most of the products must be exported-oriented"[10]. WFEs were not allowed in the early years of 'opening-up' until 1986[11]. As a result, only a few WFEs were established in China before the end of 1980s. But they had steadily increased in both investment amount and the number of investments in the 1990s. The share of total FDI by WFEs grew to about 50% in 1999 and has remained on similar levels since then.

The *joint exploitation* is the abbreviation of *maritime and overland oil joint exploitation*. This form of FDI is widely adopted in the international natural resources industry. The most prominent characteristic for this form of FDI is its high risk, high investment requirements and high reward.

The *foreign-funded share-holding enterprises* are enterprises formed by foreign investors and Chinese enterprises, companies and other organisations. Similar to EJVs, all the shareholders take the responsibilities for the company according to the shares they hold, but the shares purchased or held by foreign investors are required to be more than 25% of total registered capital of the company.

The last two forms of FDI are relatively new types of utilising FDI in recent years and they only take up very small proportions of the total FDI inflows in China (less than 2%). Thus, this study will mainly discuss the first three forms of FDI which are the main means adopted by the Chinese Government in attracting foreign investment. Normally, the risks of WFEs are higher than the other forms because joint ventures appear to be more adaptive to local market and have lower political risk. However, WFEs enjoy more tax benefits than joint ventures according to corporate income tax

[10] Ministry of Finance (2004).
[11] The law on *Enterprises Operated Exclusively with Foreign Capital* permitted the establishment of WFEs outside the special economic zones.

laws in China[12]. Table 2.1 shows the main advantages and disadvantages for those three forms of FDI.

Table 2.1

Advantages and disadvantages of different forms of FDI

Forms of FDI	Advantages	Disadvantages
Equity Joint Ventures	▪ Invest, operate and share profits/losses on equal terms; ▪ Low political risks for foreign investors; ▪ More 'preferred' form in modern business corporations.	▪ No direct incentive effect for foreign investors; ▪ Complex establishment procedures; ▪ High restrictions on foreign investors.
Contractual Joint Ventures	▪ More flexible choice of corporation methods; ▪ Easy to set up; ▪ Low restrictions on foreign investors; ▪ Low political and financial risks for foreign investors.	▪ Only attractive during the early time of 'opening up' when various kinds of risks are relatively high; ▪ Limited return for foreign investors.
Wholly foreign-owned enterprises	▪ No (or very low) restrictions on firms' operation; ▪ Foreign investors are entitled the full amount of the profit after certain initial payments to the Chinese Government.	▪ High set-up costs; ▪ Foreign investors absorb all the risks in case of a loss; ▪ High entry barriers.

Source: *author's own summary*

2.2.3. Evolution of FDI policies in China

Since 1978, China has opened its door to the international market gradually. At the same time, the Chinese Government has established the legal framework for FDI step by step and the Chinese taxation system also began a new era of development. Accordingly, the policies on FDI have changed overtime. Those changes companied with the development of FDI inflows can be divided into three stages.

The first stage is from the late 1970s to late 1980s. At this stage, the Chinese Government has focused on improving the political and legal environment for foreign investment and maintaining an open and fair market environment to encourage foreign investment. At the same time, a number of special economic zones and open cities were set up gradually since the establishment of the opening-up policy. In 1979, the *Law of People's Republic of China on Joint Ventures Using Chinese and Foreign Investment*

[12] China has a dual capital tax system from 1991 to 2007 which specifies different income tax rates for foreign invested enterprises and domestic enterprises. Generally, foreign invested enterprises are charged lower tax rates than domestic enterprises. For joint ventures, foreign and domestic investors pay different tax rates on a pro rata base. .

(*Law of Joint Ventures*) was introduced, which provides the legal clearance for foreign investment and introduces several incentives and the basic framework for joint ventures (National People's Congress, 1979). In 1983, the *Act on the Implementation of the Law on Joint Ventures* further enhances the legal system and incentive polices on attracting FDI (National People's Congress, 1983). At the same time, the *Law of the People's Republic of China on the Income Tax of the China-Foreign Joint Ventures* and the *Law of Foreign Enterprise Income Tax* which apply to contractual joint ventures and foreign enterprises were introduced in 1980 and 1981, respectively (National People's Congress, 1980 and 1981). In 1986, wholly foreign-own enterprises were permitted to enter the Chinese market by the introduction of the *Law on Enterprises Operated Exclusively with Foreign Capital* (National People's Congress, 1986a). In the same year the State Council issued the *Provisions of the State Council of the People's Republic of China for the Encouragement of Foreign Investment* and *Notice for Further Improvement in the Conditions for the Operation of Foreign Invested Enterprises* (National People's Congress, 1986b) to enforce a series of incentive policies and concessionary tax rates for FDI particularly for firms adopting advanced technologies and/or in export-oriented industries.

Since 1980, the Chinese Government has established a number of open economic zones which offered a more liberal investment and trade regime for FDI than other areas in addition to lower tax rates. Since then, these zones have played an important role in attracting FDI and made great contributions in the economic development. In 1980, China opened four special economic zones in the south of China including Shenzhen, Zhuhai, and Shantou (all in Guangdong province), and Xiamen (Fujian province). In 1988, Hainan province became the fifth and the largest special economic zone. In 1984, 14 coastal cities were opened to overseas investment for the purpose of attracting foreign capital and advanced management and technologies. In June 1990, the Shanghai Pudong New Area was opened to overseas investment. Meanwhile, the Chinese government has extended the opening areas to border cities, inland provincial capital and areas along the Yangtze River (Table 2.2).

Table 2.2

Special incentive zones in China

Tax incentive zones	Year of opening	number
Special Economic Zones	1980, 1988	5 zones
Coastal Open cities	1984	14 cities
Economic Coastal Open Zones	1985,1988	10 cities
Ecnomic and Technology development Zones	Since 1992	32 cities
New and high Technology industrial Development Zones	Since 1992	52 zones
Provincial captials and Open cities along Yangtze River	1992	24 cities
Border Open cities	1992	13 cities

Source: *author's own summary (Ministry of Finance, state administration of taxation)*

In the first stage, these regulations and the open economic zones have made considerable progress in both attracting foreign capital and establishing the new investment environment. Starting from a very low volume, China has experienced steadily annual growth of FDI from 1979 to 1988 and received USD12.05 billion actual FDI during this period[13].

The second stage is from the early 1990s to 2001. During this period, many developing countries had realised the importance of attracting FDI and took measures to provide tax incentives for foreign investors. Facing the fierce competition for FDI from other emerging countries, the new *Corporate Income Tax Law for Enterprises with Foreign Investment and Foreign Enterprise* (National People's Congress, 1991) was passed by the Chinese Government which replaced the 1980 and 1981 laws (*Law of the People's Republic of China on the Income Tax of the China-Foreign Joint Ventures* and *Law of Foreign Enterprise Income Tax*) in 1991. This law provided a more extensive range of incentives for FDI than previous laws according to their business sectors and locations. In 1995, the *Provisional Guidelines for Foreign Investment Projects* (National People's Congress, 1995) was issued to open more sectors to foreign investment, including agriculture, energy, transportation, basic raw materials and high-technology. This

[13] Statistic yearbook of China (1989).

interim provision also classified four categories for FDI policies: Permitted, Encouraged, Restricted and Prohibited. FDI inflows have increased greatly in this stage especially after 1992. The actual utilisation of FDI rose from USD4.36 billion to USD45.26 billion between 1991 and 1997[14]. Furthermore, China has emerged as the largest recipient of FDI among developing countries from the beginning of 1993, and has been the second largest recipient globally only after the US[15].

The third stage is from 2002 until present. At this stage, FDI in China has experienced steady development. In order to tackle the severe imbalance on FDI inflow in eastern and western China, policies during this period were more focused on further promoting foreign investment in the central and western regions and encouraging foreign business to invest in new high-tech industries. China's entry into the World Trade Organisation (WTO) in 2001 marks the beginning of this new era of development in FDI policies. China has made substantial commitments to trade and investment liberalisation after it became a WTO member. These changes involved: 1) the elimination of various barriers on FDI; 2) the removal of geographic and other restrictions on key sectors; 3) increased foreign ownership limits in telecommunications, life insurance, and retailing; 4) non-discriminating treatment (against state-owned banks) to foreign banks and so on[16]. With China's entering into the WTO, the investment environment has been significantly improved. There has also been new development on the features of FDI inflows with respect of capital sources, investment sectors and location choices. In 2002, the accrual utilised FDI arrived at a historical high of USD52.7 billion.

From 1982 to 2005 in China, the amount of foreign invested enterprises' income tax revenue increase from RMB10 million to RMB11.5 billion by an average rate of over 50% annually. In the past 10 years, the amount of foreign investment accounted for 10% of the total fixed asset investment in China. So far, firms funded by FDI have gained an important position in the Chinese economy. As a result, China has become a country whose economy is highly dependent on FDI.

At the same time, the structures and patterns of FDI have experienced dramatic changes in the past twenty years, which has also brought great influences on the country's

[14]Data from Chinese Economic Statistic Yearbook.
[15] Ministry of Finance (2004).
[16] "The conversion article for China's entering into WTO" Dec, 2002 (http://www.ce.cn/).

economy. The changing patterns of FDI and its impacts on China's economy will be discussed in-depth in the following sections.

2.3. Key Characteristics and Dynamic of FDI Inflows in China

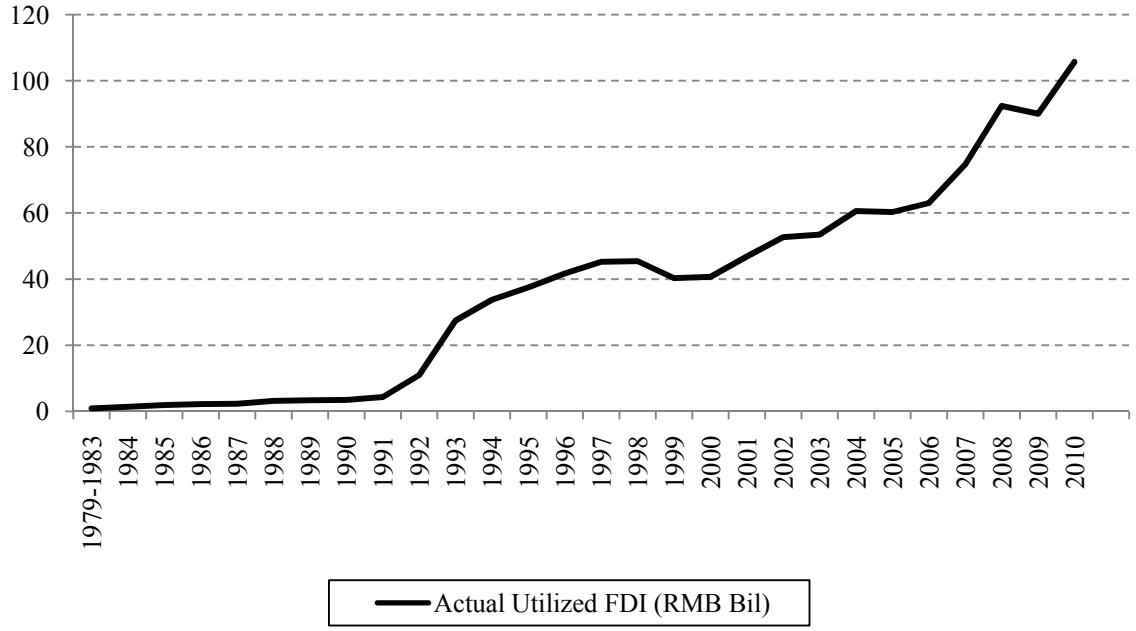
FDI inflows to China have experienced dramatic development since the start of China's economic reform especially after 1992. During 1979 and 2002, FDI inflows in China have increased from almost zero at the start of the reform to USD53 billion (actual utilised foreign investment) and 34,171 foreign-invested enterprises were newly established in 2002. In order to attract FDI inflows, China has applied a dual corporate tax system from 1992-2008 which grants a lower tax rate to foreign invested enterprises at about 15%-24% and a higher tax rate of 33% to Chinese domestic enterprises. However, this dual tax system was replaced by a unified tax system (25% for both foreign and domestic enterprises) after 2008. This section reviews the key characteristics of FDI inflows in China. The data period we discussed in this section is from the 1990s (sometimes earlier) to 2007/2008 which is also the period analysed in this study. As the tax system has been different after 2008, the information in this section is only updated until 2008.

Figure 2.1 shows the dynamics of FDI inflows over time in China. It is shown that the amount of FDI only increased by a small amount in the 1980s despite the measures the Chinese Government had taken to encourage foreign investment. From 1979 to 1984, the accumulated amount of FDI inflows is only USD18.2 billion which account for 12% of total utilisation of foreign capitals. Many factors caused the slow increases in FDI during this period, such as uncertain property rights, fear of policy reversal, strict requirement for foreign investors and incomplete investment environment. Never the less, the rapid growth in FDI began after the 'tour of southern areas' by Deng Xiaoping in 1992. The tour inaugurated a new era of development of FIEs in China, and since then the amount of FDI inflow in China has risen sharply until the Asian financial crisis in 1998 but picked up its pace again after 2000. Joining the WTO in 2001 provided another strong push to a new wave of FDI, although there was a temporary shock around 2008 probably due to the global financial crisis. Now, China is one of the largest recipients of FDI globally, which accounts for 25 to 30% of total FDI flows of all developing countries. It is believed that besides the Government's tax incentive measures and promotional policies, other factors such as growing market potential, low

labour cost and improved infrastructure also contribute significantly to the surge of FDI inflows in China.

Figure 2.1

FDI inflows from 1979 to 2010



* Source: *China Statistic Yearbook, 1979 – 2010.*

With the development of FDI inflows, the structures and patterns of FDI exhibit unique characteristics and have also changed overtime. First, the source of capital is limited. Foreign capital inflows are mainly from Asian countries or areas, particularly Hong Kong. Hong Kong has always been the most important source of China's FDI inflows which accounts for about 48.3% in total. United States, Taiwan and Japan are ranked the second, third and fourth largest investors in China respectively by 2002 (Table 2.3). Since 1995, Virgin Island has emerged as a large investor to China and the amount of investment increase rapidly every year and reached 9.4% in 2000 and in 2007 it has become the second largest investors in China. The investments from nine countries or areas account for about 85% of the total FDI inflows in China.

Table 2.3

Actual FDI by source country/territory

year	1992	1995	1998	2000	2002	2005	2007
Hong Kong	68.20%	53.50%	40.70%	38.10%	45.73%	40.9%	39.02%
United States	4.60%	8.20%	8.60%	10.80%	8.90%	8.05%	7.17%
Taiwan	9.50%	8.40%	6.40%	5.60%	7.39%	6.58%	5.79%
Japan	6.40%	8.35%	7.50%	7.20%	8.11%	8.41%	7.81%
Singapore	1.10%	4.60%	7.50%	5.30%	4.79%	4.37%	4.22%
Virgin Islands	–	0.80%	8.90%	9.40%	5.44%	7.24%	9.38%
Korea	1.10%	2.80%	4.00%	3.70%	3.39%	4.9%	4.9%
UK	0.30%	2.40%	2.60%	2.90%	1.78%	2.08%	1.87%
Germany	0.80%	1.00%	1.60%	2.60%	1.24%	1.8%	1.79%

* Source: *China Statistic Yearbook and China Foreign Economics Statistical Yearbook.*

Second, in terms of sector distributions of FDI, the investments are concentrated in the secondary industry (especially manufacturing) and real estate[17]. At the start of the period of 'opening up', most of the investments are focused on the labour-intensive secondary sectors. With the rapid economic development in China, the concentration of FDI has changed a lot and extended to other fields of economy. However, the manufacturing sector has always been the largest recipient of FDI. Table 2.4 and Figure 2.2 present the distribution of cumulative FDI by sector. Since the early 1980's, the manufacturing sector and real estate have been traditionally two biggest recipients of investment. By the end of 2008, the share of manufacturing industry in total FDI is more than 60% followed by real estate trade (16%). The presence of other sectors such as retail, business services, construction and transportation, have greatly increased since the mid 1990s which have taken up 3.3%, 4.1%, 1.9% and 2.4% of total contracted FDI by 2008, respectively. However, the traditional labour-intensive manufacturing industry still possesses the dominant position in attracting FDI. By the end of 2008, FDI in technology-intensive and capital-intensive manufacturing has almost accounted for one half of the manufacturing sector which may suggest that technologies and better environment become important motivations for foreign investors besides low labour costs. In recent years, investments in financial services have increased rapidly which becomes another emerging sector to attract FDI inflows.

[17] The secondary sector of the economy includes those economic sectors that create a finished, usable product—mainly in manufacturing and construction.

Table 2.4

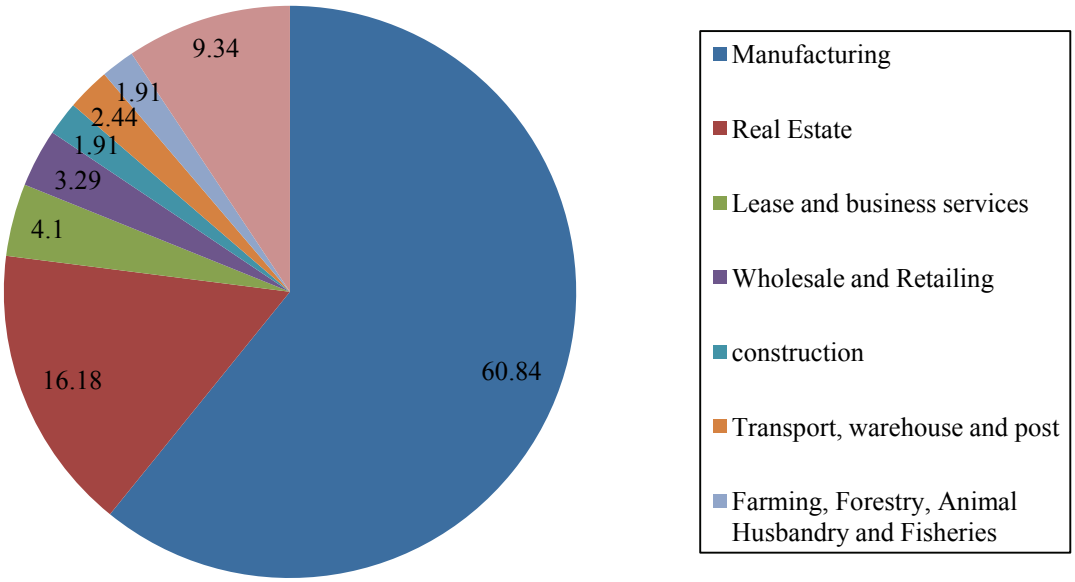
Sector distribution of cumulative FDI (2008)

Sector	Share (%)	Contractual value (USD Bil)	Number of investments
Manufacturing	60.84	1,192.25	453,817
Real Estate	16.18	317.03	49,122
Lease and business services	4.10	80.28	30,642
Wholesale and Retailing	3.29	64.45	44,723
construction	1.91	37.47	11,830
Transport, warehouse and post	2.44	47.86	8453
Farming, Forestry, Animal Husbandry and Fisheries	1.91	37.49	18,437
others	9.34	183.02	42,852
Total	100.00	1,959.56	659,885

Source: *China Foreign Economic Statistical Yearbook (2008)*

Figure 2.2

Distribution of FDI by Sector (%)



Source: *China Foreign Economic Statistical Yearbook (2008)*

Third, with regard to regional distributions, FDI is unevenly distributed across provinces in China. Most of the FDI are located in the eastern coastal regions, especially at the beginning of the period for 'reform and opening up'. Figure 2.3 shows that in 1990 about 70% of the FDI was concentrated in Guangdong, Fujian and Shanghai and there was scarce investment received by inland provinces. Among all

regions, Guangdong province has received most FDI which accounts for about half of all FDI in China. This is mainly because Guangdong is one of the first provinces to open to overseas investment and its adjacency to Hong Kong, which provides a very convenient geographic location for FDI inflows. However, the regional distribution of FDI has changed remarkably in the following twenty years. With the opening-up policy reaching far into the inland provinces, more and more local governments have taken positive measures to attract FDI. As a result, the importance of Guangdong has decreased significantly. Inland provinces such as Jiangsu, Zhejiang, Shandong, and Liaoning have become more important in FDI location choice. As indicated in Figure 2.3 the amount of FDI received by Jiangsu has exceeded Guangdong which accounted for nearly 20% by the end of 2003. This figure also reveals the evolution of FDI regional distributions from the coastal cities to the inland provinces. None the less, most of the FDI are still located in the eastern region which takes up more than 80% of total FDI while the western region has received relatively less investment which results in the unbalanced development of FDI in China[18].

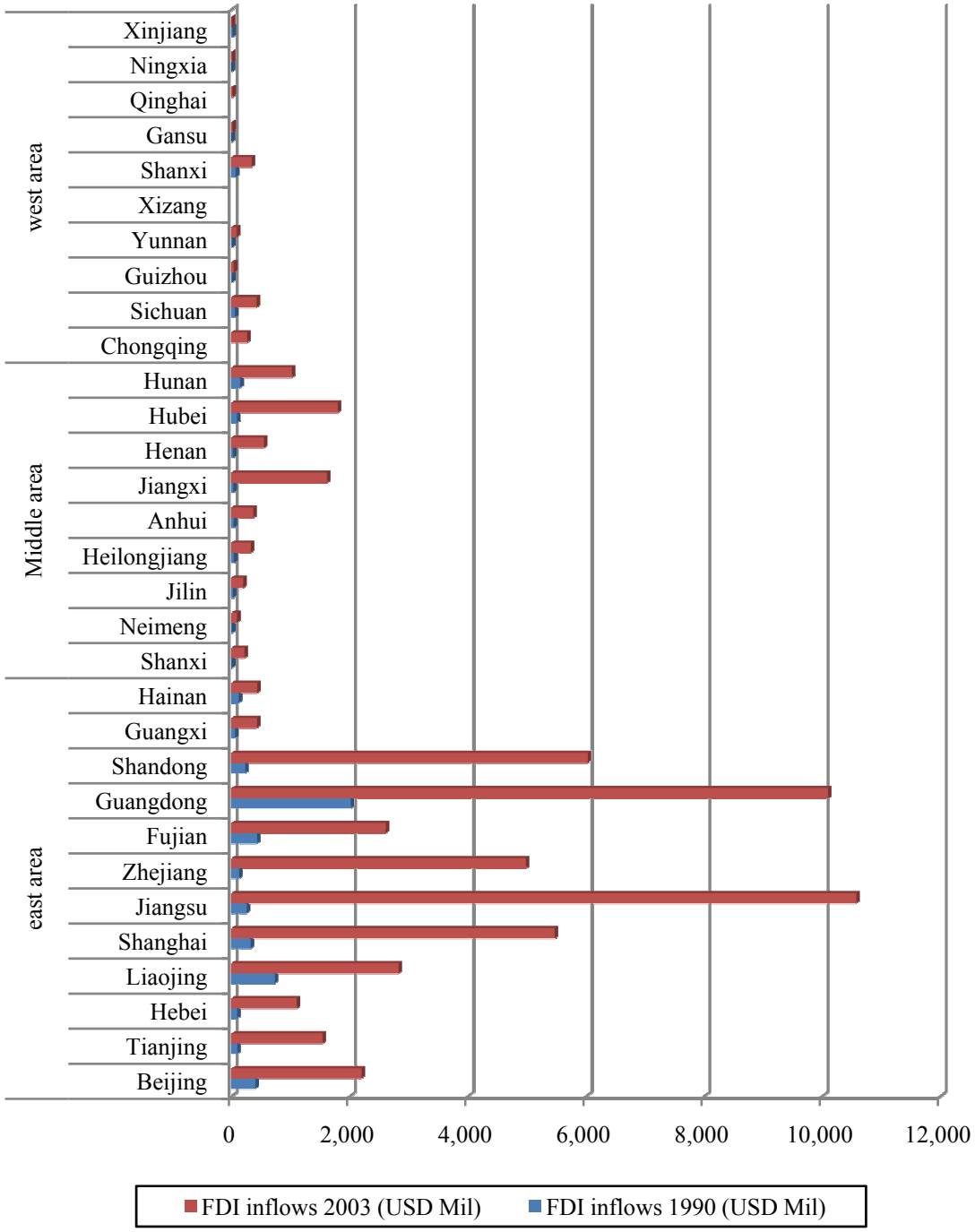
The fourth characteristic is related to the forms of FDI. As discussed previously, there are three major forms for foreign invested enterprises: equity joint ventures, contractual joint ventures and wholly foreign-owned enterprises. The distribution of different investment forms in the total FDI volume has obviously changed in the past two decades (Figure 2.4). With the rapid rise of FDI in the 1990s, the contractual joint ventures have declined substantially in absolute terms. In the early years of the reform period, the contractual joint ventures seemed more attractive to foreign investors because of its relative flexibility in co-investment arrangements, as well as the low regulatory requirement (on domestic/foreign share participation) compared to equity joint ventures. From 1979 to 1983, the contractual joint ventures have obvious dominant position which account for about 50% of total FDI inflows. This situation has changed as China becomes more open, especially after the wholly foreign-owned enterprises were permitted in China. The contractual joint ventures have dramatically decreased their dominance after 1990. Before the 1990s, the contractual alliances amounted to USD550 million, but by 1994, the number had declined to USD180 million. The wholly foreign-owned enterprises have become the major investment forms gradually which

[18] Appendix A shows a map of China to provide China's geography information.

accounted for more than half of total foreign invested companies after 1999 and the share of equity joint ventures has also experienced a remarkable decrease.

Figure 2.3

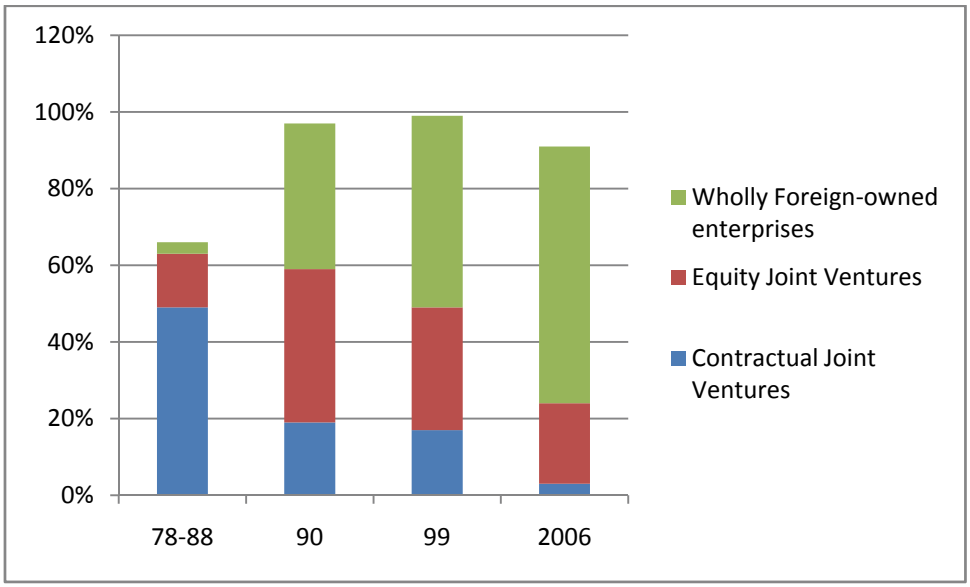
Regional distribution of FDI in China



Source*: China economic information statistic database*.

Figure 2.4

Forms of FDI in China



Source: *from annual FDI statistic of China.*

2.4. The impacts of FDI on China's economy

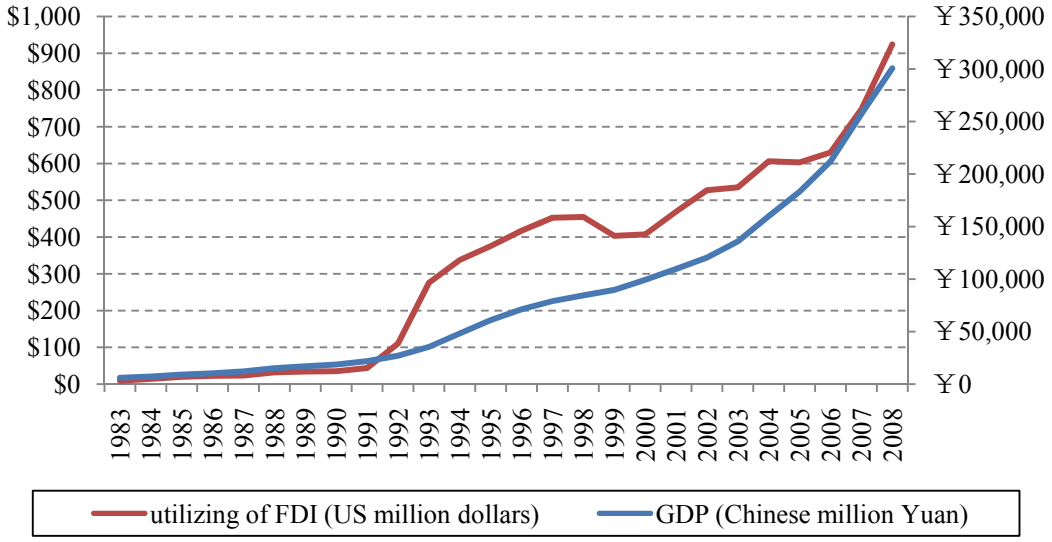
Due to the 'reform and opening up' policy and the development of FDI, China's economy has changed a lot. China has successfully transformed from a planned economy to a market-oriented economy and has achieved economic growth at double-digit for many years. With the inflows of FDI, advanced management and technologies have also been introduced to mainland China. This section will discuss the profound impacts of FDI on China's economy in different aspects.

First, FDI contributes greatly to China's economic development. China's GDP has had an impressive growth at about 9.5% annually since 'opening up' in 1978. There is no doubt that FDI is a very important factor in promoting China's reform and economic growth. Foreign investment inflows provide the essential capital, equipments and technologies for economic development. The foreign reserves in China were extremely low in the 1980s to support its economic growth and this situation was persistent until the mid 1990s when FDI inflows in China have rapidly grown. Figure 2.5 shows the growth of FDI and GDP form 1983 to 2008. It is believed that there is a positive relationship between the FDI inflows and economic growth (Chen, Chang and Zhang, 1995; Sun and Parikh, 2001; Zhang, 1999). With the development of FDI in China, the GDP has risen from RMB696 million (about USD365 million) in 1983 to over RMB300

billion (about USD44 billion) in 2008[19]. In 2006, foreign reserves in China exceeded those of Japan and become the largest in the world. The situation of the shortage of capital and foreign reserves in the early years of 'opening up' has been solved to a large extent.

Figure 2.5

Growth of FDI and GDP



Source: *Statistic Yearbook of China*, 1983 – 2008.

Secondly, as shown in Table 2.5, foreign investment has been a vital part of China's investment in fixed assets with rapidly increasing importance. In the early 1980's, the foreign investment accounted for only about 4% of the total investment in fixed assets in China and it rose dramatically after 1992 which reached its highest level in 1996 at about 11.8% of the total amount. Although it decreased to some extent in the following few years, it has undoubtedly become an important part of the capital accumulation.

[19] The exchange rate used here is the rate for the year considered (Appendix B shows the exchange rate for US dollars and Chinese Yuan over time).

Table 2.5

Total investment in fixed assets (RMB 100M), 1981-2008

Year	Total Investment (RMB Bil)	Foreign investment (RMB Bil)	Foreign investment (%)
1981	96.10	3.64	3.8
1982	123.04	6.05	4.9
1983	143.01	6.66	4.7
1984	183.29	7.07	3.9
1985	254.32	9.15	3.6
1986	312.06	13.73	4.4
1987	379.17	18.20	4.8
1988	465.38	27.53	5.9
1989	441.04	29.11	6.6
1990	451.75	28.46	6.3
1991	559.45	31.89	5.7
1992	808.01	46.87	5.8
1993	1,307.23	95.43	7.3
1994	1,782.71	176.90	9.9
1995	2,052.49	229.59	11.2
1996	2,335.86	274.66	11.8
1997	2,525.97	268.39	10.6
1998	2,871.69	261.70	9.1
1999	2,975.46	200.68	6.7
2000	3,311.04	169.63	5.1
2001	3,798.70	173.07	4.6
2002	4,504.69	208.50	4.6
2003	5,861.63	259.94	4.4
2004	7,456.49	328.57	4.4
2005	9,459.08	397.88	4.2
2006	11,895.70	433.43	3.6
2007	15,080.36	513.27	3.4
2008	18,291.53	531.19	2.9

Sources: *Statistic Yearbook of China*, 1981 – 2008.

Third, China's total foreign trading volume has also increased a lot during this period from USD38 billion in 1980 to more than USD2,174 billion in 2007. It is obvious from Table 2.6 that trade by foreign invested enterprises has contributed significantly to the growth of both export and import foreign trade. By the end of 2000, China has become the 7th largest exporter in the world and the trading volume related to foreign invested enterprises makes up about half of the total amount. The rise of the share in the total foreign trade by foreign invested enterprises is remarkable as we can see from the table and it also reflects the growing contribution of foreign investment to China' economy.

Table 2.6

Total imports and exports by FIEs (USD 100M), 1986-2007

Year	imports and exports		
	National (USD Bil)	FIEs (USD Bil)	Share (%)
1986	73.85	2.99	4.04
1987	82.65	4.58	5.55
1988	102.78	8.34	8.12
1989	111.68	13.71	12.28
1990	115.44	20.10	17.43
1991	135.70	28.96	21.34
1992	165.53	43.75	26.43
1993	195.70	67.07	34.27
1994	236.62	87.65	37.04
1995	280.85	109.82	39.10
1996	289.90	137.11	47.29
1997	325.06	152.62	46.95
1998	323.92	157.68	48.68
1999	360.65	174.51	48.39
2000	474.31	236.71	49.91
2001	509.77	259.10	50.83
2002	620.79	330.22	53.19
2003	851.21	472.26	55.48
2004	1,154.79	663.16	57.43
2005	1,422.12	831.72	58.48
2006	1,760.69	1,036.44	58.87
2007	2,174.44	1,256.85	57.80

Sources: *Statistic Yearbook of China*, 1986 – 2007.

Fourth, FDI inflows contribute significantly to the economic transformation and changes in the ownership restructuring in China. Before 1978, most of the enterprises in China are state-owned which means that the majority of the profits generated by Chinese firms were acquired by the government. However, after more than twenty years of economic reform, China has transformed from a centrally planned economy to a market-oriented economy that consists of firms with various ownership structures. The proportion of state-owned enterprises has dropped from 78% to only 9.2% in 2008[20]. There is little doubt that foreign invested enterprises provides good examples for the transformation of the ownership of state-owned firms and promote China's market liberalisation. The communication between foreign invested enterprises and local

[20] Source: The Report of Chinese Enterprises in 2008. In fact, state-owned enterprises still have a dominant position in important sectors, such as education, media, and electricity industry, Before 1978, all the profit of state-owned enterprise was give back to state, and the amount of FDI in China was almost zero. But after more than twenty years of economic reform, and so on.

governments also helps the Chinese Government to adopt the laws and regulations suitable for a more market-oriented economy.

In conclusion, FDI is an important drive in China's reform and economic growth. It helps China to complete the economic transformation and promotes the development of technology and capital accumulation. With more and more foreign investment inflows, China has experienced one of the fastest growths of GDP around the world. Moreover, it is suggested that FDI has brought the changes not only to China's economy but also to the whole society and the life style of Chinese people, which is beyond the scope of this chapter.

CHAPTER 3
Literature Review

3.1. Introduction

With the development of multinational enterprises (MNEs) and economic globalisation, studies on FDI have made some major contributions to the finance and management or even the economic literature since the 1960s. In the past 20 years, FDI has rapidly increased to exceed other international transactions such as world output and world trade flows. As more and more MNEs tend to explore every single opportunity to invest overseas, FDI is turning into a very important source of economic growth in both developing and developed countries. Consequently, many countries have taken various measures to attract foreign investment.

This chapter reviews the recent empirical literature on the determinants of FDI decisions and impacts of FDI inflows on host countries' economies. The studies discussed in this chapter include *partial equilibrium analysis* that only focus on individual factor's influences (such as market, labour and/or exchange rate) and *general equilibrium analysis* that employs multivariate regression models to test the key elements for FDI decision and impacts. With respect of the determinants of FDI, the most fundamental question is what motivates MNEs to invest overseas. Hymer (1960) argued that the imperfect market is the fundamental reason and basis for MNEs investing overseas directly. Furthermore, Markusen (1984) and Helpman (1984) suggested that the motivations for FDI can be divided into two types: *market seeking FDI* (also called horizontal FDI) in order to seek market in the host country and avoid trade frictions and *resource seeking FDI* (also called vertical FDI) with the purpose of accessing low resource such as low labour costs, infrastructure or natural resources in the host country.

The factors likely to affect FDI behaviours consist of internal factors such as firm characteristics (e.g., managerial skills, ownerships, technologies, etc.) and external factors such as exchange rates. The most predominant theory of internal factors' effects on FDI is the eclectic theory or the OLI (ownership – location – internalisation) paradigm which is developed in a series of studies by Dunning (Dunning, 1977, 1988

and 1995). The eclectic theory is a combination of many previous studies which involve monopolistic advantages theory (Hymer, 1960), internalisation theory (Buckley and Casson, 1976 and 1985), location theory (Dunning, 1958), and the theory of investment development path (Dunning, 1980, 1993). This theory is able to explain many international economic activities such as the emergence of FDI, FDI location choice and market entry mode. Dunning (1977) first proposed the 'eclectic paradigm' that MNEs' activities are determined by three factors – ownership advantages, location advantages and internalisation advantages. Afterwards, the eclectic paradigm has been developed to take into consideration of the ever-changing real world situations. Dunning (1988) indicated that the three factors of FDI activity determinants may not be the same across different industries. Dunning (1995) reappraised the eclectic paradigm theory given the changes in the global marketplace to better understand the determinants of MNE activities, especially those related to international production. He suggested that with the socio-institutional structure of market-based capitalism changing, "paradigm of international production needs to consider more explicitly the competitive advantages arising from the way firms organise their inter-firm transactions, the growing interdependencies of many intermediate product markets, and the widening of the portfolio of the assets of districts, regions and countries to embrace the external economies of inter- dependent activities".

This literature review mainly focuses on external factors that may influence FDI behaviours including tax, exchange rate, market size, labour, trade, and infrastructure and so on. The review will be structured in a manner that all previous studies are arranged by variables examined in the empirical analyses on the factors that affect FDI inflows. Regarding external factors, the most common factor concerned by academic research is tax and the next is exchange rate. Therefore, this chapter tend to give more attention towards those two factors.

3.2. Review of Previous Empirical Studies on FDI Determinants

The ability to attract FDI depends upon many different factors including national policies such as tax, exchange rate, market size or market potential, human capital especially labour cost and labour quality, international trade, and the development of infrastructure. This section reviews previous empirical analyses on those external factors that may affect FDI decisions. The studies discussed in this section are mostly

recent studies over the past two decades in order to provide a timely update on relevant literature and point out directions for further research. In particular, I try to consider a comprehensive series of the related studies (including working papers and unpublished articles) on this field, which normally concerns empirical analyses using foreign capital inflows as the dependent variable and the different measures of tax effect and other related factors as the independent variables.

3.2.1. Tax

3.2.1.1. Previous studies on FDI behaviours and taxation.

Most literature on taxation and FDI is originated from Hartman (1984). This paper is the first to point out the difference between FDI financed by retained earnings and transfer of funds so that certain types of FDI may not be related to taxation.

The basis for Hartman's argument is that there are different tax relationships between FDI financed out of retained earnings and the transfer of funds. He suggested that retained earnings should be more sensitive to taxes as a preferred marginal source of finance. This is because the costs of financing from retained earnings are lower than from transfer of new funds as retained earnings are only subject to host country tax rates.

Hartman (1984) expressed the proportion of FDI in US GNP as a function of tax rates and investment returns. Hartman applied separate specifications for FDI financed by retained earnings and transfer of new funds based on his theory using data collected from 1965-1979. The result of this study is consistent with the hypothesis that FDI financed by retained earnings responds significantly to host country tax rates while FDI from transfer of new funds does not significantly respond to host country tax rates. Although this paper is the first to separate FDI from the two different sources, Hartman only managed to consider the host country's (United States) tax rates, but not other factors that may affect FDI. Also the estimation methodology of this paper needs to be improved.

After Hartman's research, many subsequent studies have emerged based on Hartman's paper. Boskin and Gale (1987) re-estimated Hartman's model using the updated tax rate and rate of return series from Feldstein and Jun (1986). They also extended the sample

forward to 1984, and in some case backward to 1956. Moreover, they used a linear instead of a logarithm specification. This study concludes that although the results are somewhat sensitive to sample period and empirical specification, the findings by Hartman are fairly robust.

Newlon (1987) also re-examined the results of Hartman (1984) as well as Boskin and Gale (1987). However, he challenged Hartman's studies with the following two points. First, he discovered that there is a miscalculated problem with the data from the original Bureau of Economic Analysis from 1965 to 1973 used in Hartman (1984) and all earlier papers. Second, he argued that previous studies are subject to the problem of spurious correlation, i.e. the regression of dependent variable on itself. He observed that the after-tax rate of return on FDI is constructed as the ratio of total earnings by foreign controlled companies to invested capital, where total earnings comprise both reinvested earnings and repatriations, with the former equivalent to the dependent variable. Therefore, he reconstructed the sample from 1956 to 1984 and yet the results of this paper are still the same with those of Harman (1984) and Boskin and Gale (1987). In particular, the equation cannot explain the transfer of funds FDI and almost all the estimated coefficients are insignificant.

Young (1988) is another extension of Hartman's paper. Using comparable sample periods (1965-1979 and 1956-1984), Young (1988) re-estimated the models by Hartman (1984) and Boskin and Gale (1987) based on a revised dataset. The economic model used in this study is in nature a modified Hartman's model with a lagged investment term and revised data for an extended 1951-1984 sample period. The results show that, whereas FDI through retained earnings may be elastic with respect to tax rates and rates of return, FDI from new funds is inelastic with respect to tax rates and rate of return. In general, this paper does not alter the conclusion of Hartman (1984) especially for the shorter period which confirms the main findings of Hartman (1984). However, the equation for new transfer of funds using the 1956-1984 sample yields very poor results, which suggests that the simple Hartman model is not perfect for studying FDI through new funds when applied to the expanded sample period.

Murthy (1989) revisited Young's research, where maximum likelihood estimation was used to correct for autocorrelation. Unsurprisingly, most of the maximum likelihood

estimation standard errors are smaller than those reported by Young (1988) since the maximum likelihood estimators are more efficient than the ordinary least-squares estimators. Contrary to the results presented by Young, Murthy (1989) revealed that the long-run overall tax rate elasticity to new funds is highly elastic (greater than unity in absolute value) and the elasticity for retained earnings is larger than what was found in Young's results. The tax policy implication for FDI in new funds is that an increase in tax rate will decrease tax revenue and US welfare for a given pre-tax rate of return.

Jun (1989) developed his research also based on the theory of Hartman (1984) to investigate the relationship between home country tax and direct investment aboard. The tax effect on investment capital *outflows* is a new idea on this field. This paper investigates three major channels through which domestic tax policy affects direct investment capital outflows, namely the way in which foreign source income is shared among the firm, the home and the host country government, the relative net profitability of investments in different countries and finally, the relative net cost of raising external funds in different countries. Jun's study assumes that the home country corporate tax rate *t* is greater than the host country tax rate *t'*, since it is the more interesting and more plausible case than the other way round. He further assumes that transfers by the parents consisting of only equity investments and dividends are the only form of income repatriation by the subsidiary. The result of the empirical analysis shows that taxation can have a significant effect on international investment. The analysis also suggests that different financing regimes yield very different implications for the relative effectiveness of foreign tax credit and tax deferrals as a policy instrument. The sum of the effects through all three channels indicates that an increase in the home country tax rate will have a positive effect on direct investment abroad. This paper discovers a new channel through which taxation can affect international investment and suggests future empirical work on these issues.

So far, it should be noticed that none of these studies has deviated significantly from the approach taken by Hartman (1984). However, there are several problems within the standard approach which deserves further study. Slemrod (1990) criticised the earlier studies and developed an alternative methodology. This paper's main contribution is that it modifies Hartman's methodology but still uses aggregate time series data in line with the Hartman model. He suggested that all of the previous analyses are based on the

measure of *average tax rate* however the incentive to undertake new investment should depend on the *effective marginal tax rate*. Slemrod noted that none of the existing studies attempts to estimate the effect of home country's *tax system* on FDI in the US partly because of the difficulties in collecting the appropriate data. Slemrod (1990) attempted to resolve some of the empirical problems discussed above, where he extended and updated a Hartman-style model of aggregate FDI in the US by partly replacing average tax rate with a measure of marginal effective tax rate.

The hypothesis for Slemrod's study is that the tax systems of both host country and the investing firm's home country can affect the incentives and sources of finance concerning FDI. Two standard treatments to deal with this *double taxation* issues are for the home country to offer a credit or a deduction/exemption of foreign tax payment made by the multinational enterprise. Moreover, Slemrod controlled for other variables that affect FDI (and which are potentially correlated with the tax term). Using data from 1964 to 1987, the paper finds that retained earnings FDI are not responsive to US taxes, and identifies a significant elasticity for FDI through transfers of funds. This result is in sharp contrast to that of Hartman and others. The results suggest that taxes have a significantly negative effect on aggregate FDI. Further, Slemrod (1990) is innovative in a way that he took home country tax system into consideration. Specifically, he divided all the investors into two groups: investors from credit countries (Japan, UK and Italy) and those from exemption countries (Germany, the Netherlands, Canada and France). He argued that those two types of investors should have different tax sensitivities to FDI. Slemrod tested this hypothesis using investment flow data from the above seven industrialised countries into the US to investigate the systematic difference between the two types of investors. Since then, aggregate time series methodology has been widely used by studies for bilateral investment during the 1990's.

Hines (1996) also considered the effect of *double tax relief* and different international tax systems on FDI. He adopted the methodology by Slemrod's (1990) to use data on individual countries' direct investment into the different states of US. The motivation of this paper is to investigate the effect of taxation on the exact volume of FDI for different states in the US. He compared the distribution of investments from countries that allow foreign tax credits with investments from all other (fully taxed) countries and examined the effect of state tax rates on the distribution of FDI. Hines (1996) divided all the

countries into two groups using different methods of relieving double taxation: the 'credit' and 'non-credit' systems for foreign investors. He collected data on PPE (property, plants and equipment) from seven investing countries into 50 states in 1987 and investigates the impact of state corporate income taxes on the allocation of FDI. The empirical results suggest that high state tax rate has a significantly negative effect on the allocation of FDI in the US. On average and all other things equal, a difference of 1% in the state tax rates leads to a difference of 9 to 11% in shares of manufacturing capital owned by lightly taxed and fully taxed investors. In addition, a percentage difference in state tax rate is also associated with a difference of 3% in the propensities of lightly taxed and fully taxed investors to establish foreign affiliates.

Some other studies tend to investigate the cross-country or cross-sector effects of taxation on FDI. For example, Grubert and Mutti (1991) exploited the relationships between taxation and multinational corporate investment decision makings. They identified three interrelated aspects of US multinational corporation activities: the ability to shift profits from high-tax countries to low-tax countries, the impact of host country taxes and tariffs on the distribution of real capital, and the influence of these policies on international trade patterns of the United States and host countries. In addition, they suggested that a complete cross-sectional empirical analysis of investment and trade requires a multilateral view. Therefore, this paper examines the relationship between tax rates and profit margins as well as the impact of host country tax rates and tariffs on the stock of real capital controlled by US multinationals in each location using 1982 data on a cross-sectional analysis of 33 countries. Two measures of affiliate profitability are used in this study: the ratios of book income to sales net of any purchases from the parent, and the ratio of book income to equity. The analysis indicates that both taxes and tariffs have strong impacts on the operations of multinational corporations and the influence of taxes on income shifting, foreign investment, and trade patterns appear to be statistically significant. Furthermore, it is found that US parents are more likely to export to their foreign affiliates in low-tax countries, which is consistent with income-shifting incentives. However, US exports to these countries seem much less responsive to tax incentives, and US total net exports may even fall because exports to third countries may decline and imports may rise. A disadvantage of this study, though, is that it only considers manufacturing firms.

Similarly, He and Guisinger (1993) compared the impact of effective tax rates on FDI in developing and developed countries using the same method as Grubert and Mutti's research. They found that changes in effective tax rates have a significant effect on FDI and the effect is greater in developed countries than in developing countries.

Hines and Rice (1994) extended Grubert and Mutti's research by examining the closely related issue of the ability of US firms to shift their reported profits and real business activities from high-tax foreign countries to low-tax foreign tax havens. They used the same method as Grubert and Mutti (1991) but on a different dataset. Particularly, Hines and Rice collected data for more countries including a number of tax havens and they concentrated not only on manufacturing firms but also other non-financial companies. As a result, Hines and Rice found a higher tax elasticity (on FDI) than in Grubert and Mutti's study, which suggests that the ability to shift reported profits into tax haven affiliates raises the already significant attractiveness of haven locations for ordinary business operations. In other words, tax rates are negatively related to local employment of capital and labour. The tax sensitivities of total taxable profits are significantly increased when considering jointly the endogenous location of factors and the ability to shift reported profits away from high-tax locations. Hines and Rice suggested that this elasticity may partly explain the behaviour of tax haven governments especially for a "small country with a small indigenous tax base". The result of this paper demonstrates the trade-off between investing in the US and tax havens, which should be a direction for future economics and legislative reforms.

Meanwhile, some other studies have developed their research on the effects of changes in tax laws on corporate activities. Scholes and Wolfson (1990) argued that the Tax Reform Act of 1986 should be associated with economically important shift in corporate activities in the US. They made the hypothesis that FDI in the US from multinational enterprises would increase when US tax rates increase. As a result, they found that the tax changes in 1980s are indeed related to more merger and acquisition activities in the US. Moreover, foreign acquisitions and domestic acquisitions should be affected in different ways based on their hypothesis. The evidence from the empirical study is consistent with the 1985 Tax Reform's intention to stimulate foreign demand for US business. Moreover, the increase in foreign demand for US businesses was approximately offset by the decrease in domestic demand for US businesses.

Swenson (1994) re-tested the same hypothesis as Scholes and Wolfson (1990). This paper examines the impact that the US 1986 tax reform has on FDI across industries. Using a panel data model for the period between 1979 and 1991, this study exploits the changes in tax rates from the 1986 tax reform. She concluded that the amount of FDI and the US after tax cost of capital are indeed positively correlated, particularly for worldwide taxation countries.

Jun (1994) extended the studies on how taxation affects FDI by considering the taxes in both home and host countries. He used a panel data of FDI inflows from ten non-US countries between 1980 and 1989 to estimate a linear specification with alternative tax measures. He found that tax rules significantly affect capital flows via foreign direct and home country taxes in particular the behaviour of FDI. In addition, Jun indentified different tax parameters in home and host countries to investigate different channels through which taxes affect FDI. The most notable finding of Jun is that the home country statutory tax rate has a significantly negative effect on FDI when the country makes "foreign-source income subject to home country taxation".

Similar to Slemrod (1990), Cassou (1997) investigated the impact of tax policy on FDI inflows in the US and other countries. He collected data from 1970 to 1989 but used a panel data set-up rather than single time series data. He argued that panel data analysis is more robust and offers greater flexibility in terms of independent variables. However Cassou still used the same method as Hartman (1984) which distinguishes FDI financed by retained earnings and transfer of funds. This study finds many significant factors that influence transfer of funds FDI, but not retained earnings FDI. However, the contribution of this paper is that it suggests that besides host and home country corporate taxes, the host and home country income taxes are also significant in explaining FDI inflows.

Grubert and Mutti (2000) used a dataset of more than 500 US multinational corporations to investigate whether host country tax rates influence the amount of capital invested in certain locations/countries. The motivation of this paper is to assess the sensitivity of taxes on the location choice of US investors. The empirical analysis is based on the data from US treasury 1992 corporate tax files, which cover the activities

of more than 500 major US manufacturing companies investing in 60 potential foreign locations. The basic model in this paper follows Hines and Rice (1994), which examined the determinants of a multinational corporation's optimal capital stock in a given country. The variables included in this model are costs of capital and labour, tariffs and transportation costs, and plant-specific fixed costs. Grubert and Mutti found that the host country's average tax rate has a highly significant effect on the investment decisions of US manufacturing companies. Specifically, a lower tax rate that increases the after tax return to capital by 1% is associated with 3% more real capital invested if the country has an open trade regime. This effect remains significant even when tax havens or very poor countries are excluded from the sample. Additionally, the result also suggests that countries with more restrictive trade policies appear to be less attractive to US investors, mainly because trade restrictions are usually linked to restrictions on business. Consequently, countries with restrictive trade regimes are less capable of attracting foreign investors even with lower tax rates.

Hines (1999) undertook a comprehensive review of recent US literature and suggested that taxation significantly influences not only the location of FDI, but also corporate borrowing, transfer pricing, dividend and royalty payments, and R&D performance. This paper reviews the empirical evidence on how international taxation influences patterns of FDI and the extent of international tax avoidance activity. Moreover, this review finds that international evidence implies that investment location and tax avoidance activities are more responsive to tax rate differences than is typically implied by domestic evidence.

Later on, Mooij and Ederveen (2001) reviewed the international evidence on the impact of tax on foreign direct investment allocation. In particular, this paper compares the outcomes of 25 empirical studies by computing the tax rate elasticity under a uniform definition. The method of this paper is innovative in the way that it analyses the different results of empirical research that use different measures of tax. In order to make the outcomes of various studies comparable, Mooij and Ederveen (2001) transferred the coefficient estimates of each study into a uniformly defined elasticity measure which is called semi-elasticity or tax rate elasticity. He used this variable to measure the percentage change in FDI in response to a 1% change in the tax rate. This study finds a median value of tax rate elasticity of around -3.3. In other words, a 1

percent reduction in the host country tax rate will increase foreign direct investment in that country by 3.3 percent. Moreover, this paper also considers problems such as FDI financed by retained earnings and transfer of funds, different double tax relief method (exemption and credit countries), choice of foreign investment data and different choice of tax rates (statutory tax rates, average tax rates, average effective tax rates and/or marginal effective tax rates). The paper concludes from previous studies that the semi-elasticity for retained earnings FDI is indeed larger than pooled FDI and FDI through the transfers of funds, which has a positive tax-FDI sensitivity (i.e. a reduce in tax rates actually *reduces* FDI from transfers of funds). Moreover, studies using investment data on PPE yield a significantly higher semi-elasticity than the rest of the studies, such as those using data on mergers and acquisitions. Finally, the result also suggests that both average tax rates and effective tax rates (marginal or average) have a larger effect on FDI than country statutory rates. However, this study does not support the conclusion that investments from tax credit countries are less responsive to taxes than investments from tax exemption countries. This result has put the methodology adopted by Hines (1996) in doubt, which uses the distinction between credit and exemption countries to indentify the tax elasticity of FDI. Therefore the comparison between different double tax treatment regimes is an interesting topic for future research.

3.2.1.2. Tax and the location choice of FDI

The previous section mainly considers the question of "whether to invest" by foreign investors, this section is more concerned with "where to invest". Studies on the relationship between tax incentives and the choice of business locations is another common research topic on FDI especially in recent years, when many countries or areas take various measures to attract foreign investment. In addition, investors also want to know where they should locate their plants. Taxation incentives are considered to play an important role in attracting FDI, and the view is supported by empirical studies.

Carlton (1983) presented a model of the firm's decision on the location and employment choice of new branch plants. Given the limited research on the location choice of FDI in early years, this paper is among the first to explore the factors influencing new business location. Previous empirical studies have ignored many questions such as firm size, employment, energy and wage costs which may be linked to the new firm location choice. Carlton (1983) generates a tractable model which gives robust estimates and

provides future researchers/analysts with a method for simultaneously predicting location and employment. The key methodological contribution of this paper is to demonstrate that both investment and employment decisions are closely linked via the 'duality theory' using an empirical model. Particularly, this methodology allows for the direct testing of the independence of irrelevant alternative assumptions in a logit model. The use of disaggregate data is another important contribution of this work. Carlton (1983) used two types of data is this study: one that contains information on new branch plants from 1967 to 1971 and one with information on region-specific economic variables. The result of the empirical analysis shows that the model performs well in predicting the size of plants and energy costs have a significant effect on the location choice of plants. The evidence also indicates that the smaller the average size of a plant is, the larger the effect of the concentrations in employment. Moreover, for highly sophisticated industries, the availability of technical experts is considered to be a very important factor. However, tax and state incentive measures taken by the government do not seem to have significant effect. Therefore, he concludes that corporate income tax rates do not have obvious effect on the regional choice of investments within a country.

Similarly, Moore et al (1987) examined the influence of both the state corporate income tax rate and the form of income tax base structure on foreign investment in manufacturing assets. This paper tests the hypotheses that there is a negative relationship between total business tax rates and the level of foreign investment and the method a state uses to measure the income tax base. The theoretical model of this paper is based on a *supply-oriented* economic theory for regional investment rather than an *aggregate-demand* theory. As a result, the regional investment model is very similar to the location choice model. This paper uses data on net foreign investment in gross manufacturing assets by state from 1977 to 1981. It is found that business climate, agglomeration economics and unitary tax structures are all important determinants of foreign manufacturers' investment decisions. Similar to Carlton (1983), business income tax rates seem to have limited impact on the amount of foreign investment.

Papke (1987) also investigated the effect of interstate tax differentials on the location of capital investment but used a different measure of relative business tax burdens (the after-tax rate of return on a marginal investment) in the empirical model. The purpose of this paper is to explore the appropriate measure of business tax differentials for

analysing investment decisions and find out whether local business tax differential is an important factor for the location choice of capital investment. The use of after-tax rate of return is based on the neoclassical theory of capital accumulation and the user cost of capital notion initially proposed in Hall and Jorgenson (1967), which suggest after-tax rates of return vary across states and industries. The model predicts that the demand for new capital is a demand for capital at a specific location, so the decision to invest is equivalent to the location decision and the estimated coefficients will measure the location sensitivities. Papke (1987) also assumed that for each firm making a marginal investment, whether in an existing or new facility, it is faced with a choice of investment locations at any given period. As a consequence, the independent variables used in the empirical study include the average productivity of labour, local business tax burdens, local average wage, local average cost of energy, and industry dummy variables. The dependent variable is the new capital expenditures.

The empirical findings of Papke (1987) support the hypothesis that investment location decisions among states are affected by state-local tax cost differentials. Papke (1987) suggested three policy implications prompted by the empirical results. First, the prominent effect of capital flows to after-tax rates of returns identified in this paper may have "significant implications for the efficacy of sub-national industrial policy". Second, as the sensitivity of investment location responds significantly to tax-cost differentials, it gives rise to "a possible re-evaluation of the relative shares of sub-national business taxation between the manufacturing and nonmanufacturing sectors". Last, Papke suggested that the empirically significant evidence of sub-national tax-price elasticity may well be applied to studies at international level. However, there are some questions left unsolved in this study such as whether or not specific industry investment is responsive to the state tax incentives aimed at lowering the cost of capital.

Some studies that investigate tax incentives across countries concentrate specifically on the tax incentive measures of developing countries and their effects on FDI. For example, Hadari (1990) discussed the typical tax incentives in developing countries to encourage capital investment. Almost all developing countries are using tax incentive measures to attract foreign investment in recent years and this paper chooses some of the developing countries at the time of the study to analyse including Iceland, Greece, Israel, Taiwan, Mexico, Egypt and Nigeria. For the countries under investigation, the

most prevalent form of tax incentive measure is to offer greater tax preferences to foreign investors over domestic investors. However, in Hadari's opinion, tax incentives should not discriminate against local investors. At the same time, he also argued that foreign investors need a reasonable solution of double tax relief to avoid investment risk. This study suggests that general favourable economic and tax regimes, including governmental economic policies that affect economic growth, are a more important determinant of FDI than any particular incentives to "compensate for a lack of long-term solution". This implies that a good economic environment and healthy economic growth are more attractive for foreign investors than tax incentives alone for developing countries.

Some other studies also concentrate on the comparison of tax incentives between developed and developing countries and/or among themselves. Coughlin et al. (1991) estimated a conditional logit model on the location choice of foreign firms to invest in manufacturing facilities in the United States using data from 1981 to 1983. They found that foreign investment decreases with tax rates and increases with the availability of tax incentives. Besides, they suggested that the expected taxation infrastructure is an important determinant of capital investment which should be considered by the local government. The empirical results also indicate that income per capita and the density of manufacturing activities are positively related to foreign direct investment. Moreover, unemployment rates also have a positive effect on foreign investment while wage rates have a negative impact. However, they found that higher unionisation rates were related to increased foreign direct investment. Finally, there is evidence that transportation infrastructure and promotional expenditures are significantly positively associated with FDI.

Billington (1999) used aggregate FDI inflows into the UK to estimate the tax elasticity on FDI. In this paper, various factors are analysed to find out the ones that determine the location choice for FDI. This research use two empirical models: a multi-county model including seven industrialised countries and a multi-region model consisting of 11 regions in the UK. For both models, Billington adopts a 'general-to-specific' approach. The analysis initially includes all the variables which could conceivably be important and then works down to the core of variables which are significant. At country levels, this study finds that GDP growth and interest rates both have a positive

effect on the inflow of FDI. The coefficient estimate for import is also positive which suggests that imports appears to be a complement rather than substitute to FDI. Similar to most previous studies, corporate tax rates have a significantly negative impact on FDI inflows. At both country and regional levels, high unemployment is found to have positive effect on FDI, which supports the view that unemployment is regarded as a proxy for labour availability and the government's regional support to depressed areas. The other beneficiary factors for FDI include high population density and high level of infrastructure but wage cost is a minus for foreign investment. Never the less, it is argued that the specifications of the models could be improved and the avenue of exploration should be taken into consideration, which this paper fails to do so.

Beaulieu et al. (2004) developed an equilibrium model of FDI location decisions. The objectives of this paper are to re-examine the theoretical characterisation of the tax variable, and investigate its empirical importance in the business location decision of the firm. The main contribution of this study is that it uses additional variables which were not considered in the previous studies, including firm characteristics such as size and sector, the quantity of goods the firm produces, the price the goods sold at, and the geographical region of the firm. Beaulieu et al. (2004) used a three-dimension panel dataset where the dependent variable is the number of business establishments in each of Canada's six largest provinces for nineteen manufacturing sectors over a period of twenty-eight years from 1970 to 1997. This study is built on the assumption that various types of taxes affect the business location decision of firms, and all firms' utilities are maximised by minimising the costs for the location choice. Moreover, firms are assumed to be price-takers in the factor markets. The effective average tax rate on marginal cost is regarded as a function of the marginal effective tax rates on both labour and capital inputs. In addition, to account for all the potential differences across provinces and sectors, this study allows for fixed effects across both regions and industries. The empirical results show that the elasticity of the number of manufacturing establishments with respect to the effective tax rate for marginal cost is around −0.30. The empirical evidence also suggests that wage rates and energy costs appear to have negative effect on manufacturing establishments while governments spending on transportation are positively associated with the firm's investment location choice.

3.2.1.3. Tax and FDI distributions in China

Due to the rapid growth of the amount of FDI after the tax reforms in the 1990s, researchers have been increasingly focused on China to study the impact of tax incentives on FDI for emerging countries. This part will discuss the studies on the changes and effects of taxation on FDI distributions in China. With the unique feature of China's economy, the development of foreign investment in China has its own characteristics. Many researchers believe that foreign investment in China develops with the opening-up policy and economic reform, which have resulted in significant changes in the Chinese tax system. In his section, we will mainly concentrate on the transformation of the amount and forms of FDI in China, which is presumed to be related to the changing of Chinese taxations regarding foreign investment.

Tung and Cho (2000) investigated the effect of tax reform in the 1990s on FDI and the influence of tax regulations on FDI organisational forms. This paper follows the method of Scholes and Wolfson (1989, 1992) but uses Chinese data to test the same hypotheses. The purpose of this paper is to examine two questions: first, whether or not the creation of special tax incentive zones is an effective policy for China to induce more FDI and second, whether or not the changes in tax regulations influence the particular form[21] of FDI selected. Given the changes in the corporate income tax law in 1991, the paper tests three basic hypotheses: first, FDI inflows in the special tax incentive zones are expected to be greater after the implementation of the concessionary tax rates than before; second, the annual growth rate of equity joint ventures is expected to be greater than the growth of the other two forms of foreign invested enterprises before 1991 and third, the growth rates of the other three forms of FDI are expected to be similar after 1991. The data collected is from 1988 to 1994 which is 3 years before and after the introduction of concessionary tax rates for the special tax zones. Consistent with all the conjectures, the regression results provide statistically significant evidence that concessionary tax rates and incentives are an effective way to attract FDI into the designated special tax incentive zones in China. This result is also consistent with most of the previous studies. The limitation of this study, however, is the ceteris paribus assumption it is based on. The paper just assumes that besides tax incentives, other important government policies, labour costs and geography factors should also be important in attracting FDI and therefore these factors are not controlled for in their analyses.

[21] The major forms of FDI in China are discussed in detail in Chapter 2.

Based on the limitation of their earlier paper, Tung and Cho (2001) extended their research with a more robustly specified model. This paper considers additional factors besides taxation including infrastructure, unemployment rate, wage rate and unionisation. The model of this study is developed from Carlton (1983) and Moore et al. (1987) and is similar in nature to the location choice model. They found that tax rates and incentives are important determinants of the regional choice of foreign firms in China. Specifically, areas offering lower tax rates or increased tax incentives are found to have greater attractiveness to foreign investors. The results also suggest that infrastructure variables are important factors to attract FDI into certain areas. This paper represents an initial attempt in determining the effectiveness of China's tax policy on FDI. However, many key questions remain unanswered, such as the effect of the double tax relief, the influence of country-of–origin and especially the regional differences in the distribution of FDI in China.

Fung et al. (2002) traced the development of China's economic policy regarding FDI and the resulting changes in FDI inflows over the recent twenty years. Furthermore, this paper also empirically investigates the relationship between FDI inflows and China's economic development. They concluded that increases in the amount of FDI in China are related to the change of gross national product (GNP), fixed-asset investment, foreign trading volumes, economic transformation and the transfer of advanced technologies. In general, they argued that FDI inflows are influenced by almost every aspect of China's society. At the end of this paper, the authors also predicted the future trends of FDI in China after entering the WTO in 2001. Similarly, Lai (2002) reviewed the recent trends and patterns of FDI in China. He analysed the growth of FDI by different sectors and regions for the period 1979 – 2000 with special focus on the unbalanced distribution of FDI in China.

Huang (2003) examined the dual tax system in China that applies different regulations and laws to foreign and domestic business activities. He indicated that in many important aspects, the legislative and regulatory framework applied to foreign investment enterprises appears to be superior to domestic enterprises, especially for domestic private firms. The motivation of this tax system is to attract foreign investment and it indeed has a great effect on FDI inflows. However, this paper does not evaluate

the possible negative effect and the future development of this dual tax system.

Ho (2004) contributes to the existing literature by examining the determinants of FDI at sectoral level in China. This paper reviews the evolution of China's foreign investment policy and divides the development of FDI in China into 3 stages: the initial phase (1979 – 1985), continuous development stage (1986 – 1991) and high growth period (1992 – present). The empirical analysis is based on a pooled dataset of 13 sectors for the whole country and 9 sectors for the Guangdong province from 1997 to 2002. The independent variables include gross domestic product (GDP) sector indicators, wage rate, innovation level, and enterprise ownership. The empirical results show that large market size, low wage rate, high degree of economic reform and innovation activities encourage sectoral FDI inflows in China. For Guangdong province, all variables are found to be significant except for innovation activities.

Du et al (2008) focused on the importance of economic institutions in attracting FDI by multinationals. Their empirical analysis is based on a dataset of 6,288 US multinationals investing in different regions in China during 1993 and 2001. The main findings are that US multinationals prefer to invest in regions with better protection of intellectual property rights, a lower degree of government intervention in business operations, a lower level of government corruption, and better contract enforcement. This paper does not consider the cross-country impacts of economic institutions on FDI as it is difficult to control for the differences in political system, culture and language, corporate tax policies, and national trade and investment policies across countries. This paper has significant policy implications for emerging countries as well as all other transitional economies that strong economic institutions are a very useful measure for attracting FDI inflow.

Lan and Yin (2009) paid their attention to the western areas of China to investigate the economic factors that help attracting FDI there. The factors they examined include economic development situation, labour cost, trade barrier, material basic establishment and FDI accumulation. This paper bases its analysis on the case of Chengdu, one of the largest cities in west China, from 1990 to 2006. Lan and Yin showed that quicker economic growth, higher degree of openness, and higher investment in fixed assets are important economic factors in attracting foreign investment into Chengdu. This paper

contributes to the literature in the sense that few people previously have focused on the determinants of FDI in western cities as most of the FDI in China are located in the eastern areas. However, with the fast development of western cities in recent years and the latest national campaign in developing China's western regions, attentions should be gradually shifted towards west both from academic and political perspectives.

3.2.2. Exchange rate

The theories of FDI have developed a lot in the past 40 years. However, most of the early research is focused on the differences in the rate of return on capital among countries. Since the studies by Hymer (1960) and Caves (1971), other external factors have been increasingly considered.

Many scholars believe future exchange rates have certain effect on firm's cash-flow, and thereby influence the firm's decision to make entry investments into a foreign country. However, empirical studies provide mixed support for the link between exchange rates and FDI. Some studies, such as Caves (1989), Froot and Stein (1991), Swenson (1994), Klein and Rosengren (1994) have found a significant correlation between the fluctuation of dollar and the amount of FDI in the United States. However, there are other studies that have found little support for the exchange rate effects on FDI, including Ray (1989), Stevens (1992), and Healy and Palepu (1993).

With the development of FDI theory, it is believed that the uncertainty of fluctuations in real exchange rates can lead to a variety of risk and expectation effects on FDI. Kohlhagen (1977) and Itagaki (1981) argued that expected future exchange rates will affect the firm’s entry decision, and as most of the firms are risk-averse, the uncertainty about the future behaviour of exchange rates can deter entry. In addition, Cushman (1985) analysed the effects of real exchange rate risk and expectations on FDI. Different from the previous studies, this paper uses *real* exchange rates and considers both capital and labour input levels. The pooled estimation results for bilateral direct investment flows show significant reductions in US direct investment associated with the increases in both current and expected real value of foreign exchange. Moreover, Dixit (1989) showed that a higher level of foreign exchange uncertainty will deter entry in the presence of risk-neutral firms. Dixit established a two-period model, where a firm has the option to enter/exit a market or to wait one period and then decide. When the

exchange rate becomes more volatile, firms are more likely to wait so neither entry nor exit occurs.

Campa (1993) extended the framework of Dixit (1989) to test the effects that real exchange rate fluctuations have on the decision of foreign firms entering the U.S market during the 1980s. Campa estimated the effects of uncertain exchange rates and industry-specific sunk costs on risk neutral firms using disaggregated data and found them to be negatively associated with firms' entry decisions. In addition, Campa (2003) also revealed that high level of advertising expenditures tend to deter entry. Tomlin (2000) extended Campa's sample period to 1993 and used a zero-inflated Poisson (ZIP) model to analyse FDI in the US wholesale trade industry. In contrast to Campa, Tomlin found that neither the level nor the standard deviation of exchange rates has any effect on the amount of FDI. This suggests that while exchange rate variables may affect the probability of entry, they do not affect the average volume of foreign investment.

On the other hand, Froot and Stein (1991) examined the relationship between exchange rates and FDI that arises when globally integrated capital markets are subject to informational imperfections. They questioned the old view that exchange rates do not alter foreign investors' opportunities and developed a model of FDI which is capable of explaining the observed importance of exchange rates for direct investment by linking wealth positions and investment, and then exchange rates and FDI. They found that exchange rate changes have important impacts on international wealth, and therefore in turn systematically affect FDI.

Furthermore, Stevens (1998) extended the sample period of Froot and Stein (1991). However, he showed evidence of serious instability inside and outside the 1973-88 sample period: the significantly negative relationship between FDI inflows and the value of US dollar holds for only part of this sample period. Moreover, when the sample period for the quarterly regression is extended to 1991, the estimated coefficient on exchange rate again becomes insignificant. Similarly, Klein and Rosengren (1994) investigated the source of the relationship between US inward FDI from seven industrialised countries from 1979 to 1991 and the respective bilateral dollar real exchange rates. Furthermore, they identified variables to distinguish between the relative wealth and the relative labour costs hypotheses. As a result, their empirical

results support the significance of the relative wealth channel but fail to support the relative labour cost channel hypothesis.

Some other studies have paid attention to other aspects of exchange rate effects. For example, Goldberg and Kolstad (1995) emphasised and explored the implications of short-term exchange rate variability for FDI flows based on previous studies. They conducted a bilateral analysis for FDI flows between the US, Canada, Japan, and the UK. The empirical results are consistent with the theory that exchange rate volatility tends to stimulate the share of investment activity located on foreign soil. However exchange rate volatility does not have statistically different effects on investment shares if one distinguishes between periods when real or monetary shocks dominate exchange rate activity. At the same time, Kogut and Chang (1996) tested whether exchange rate movements influence the timing of investment for a firm conditional on its previous investment, while allowing for a secular aggregate trend FDI using firm level data of Japanese electronics companies that invest in the US. The results show that previous entry serves as an option for future expansion and real exchange rate movements significantly affect investment decisions to enter the market.

The Asian financial crisis of 1997-1998 has reinforced the view that short-run capital flows (both inflows and outflows) are one of the major causes of the crisis. After the crisis, Quere, et al (2001) provided a framework for an exchange rate strategy aiming at attracting FDI and examined the choice of the exchange rate regime by integrating the determinants of multinational firm's locations. They argued that exchange rate volatility is detrimental to FDI. Their results have the policy implication that the building of currency blocks could be a way of increasing FDI for most emerging countries. In addition, a series of other studies (Xing and Zhao, 2003; Guo and Trivedi, 2002; Kiyota and Urata, 2004) look into the similar topic as Quere et al (2001) to investigate the role of exchange rate in the competition of FDI and Xing and Zhao (2003) found that relative exchange rate is significant related to the inflow of FDI.

Recently, Alba, et al (2007) examined the relationship between exchange rates and FDI by taking into account the possible interdependence of FDI over time. The main empirical finding of their paper is that FDI is indeed interdependent over time. In addition, when industries are favourable to FDI, the exchange rate-related variables

have positive and mostly significant impact on FDI inflows. These results clearly indicate a positive effect of both the level and the trend of exchange rate. Later on, Christian W.S. (2008) introduced an analytical framework that analyses the impact of both real exchange rates and real exchange rate risks on FDI outflows in nine industries from the US to six partner countries between 1983 and 2004. Unlike previous studies, they applied two different measures of exchange rate volatility. When using the standard deviation of real exchange rate as a measure of risk, they reported that the exchange rate uncertainty has a significantly negative effect on FDI flows for the majority of the nine industries. However, using an alternative risk specification (the unexplained part of real exchange rate volatility) results in a diverse outcome among industries: while manufacturing industries exhibit a negative sensitivity of real exchange risk on US FDI outflows, the relationship is none the less positive for non-manufacturing sectors.

Table 3.1

Summary of main empirical findings for exchange rate effects

Exchange risk and FDI inflows		***Currency depreciation and FDI inflows***	
Kohlhagen (1977)	**-ve**	Cushman (1985)	**+ve**
Itagaki (1981)	**-ve**	Dixit (1989)	**-ve**
Cushman (1985, 1988)	**+ve**	Froot and Stein (1991)	**+ve**
Dixit (1989)	**-ve**	Campa (1993)	**-ve**
Campa (1993)	**-ve**	Blonigen (1997)	**+ve**
Goldberg and Kolstad (1995)	**+ve**	Klein and Rosengren (1994)	**+ve**
Quere et al (2001)	**-ve**	Stevens (1993)	**-ve**
Tomlin (2000)	**No**	Stevens (1998)	**No**
Gorg and Wakelin (2002)	**No**	Pain and van Welsum (2003)	**No**
Pain and van Welsum (2003)	**+ve**		
Kiyota and Urata (2004)	**-ve**		

Source: *author's own summary*

In summary, the empirical analyses on exchange rates and FDI have been mainly focused on two questions: the impact of exchange rate uncertainty or exchange rate risks on FDI, and the relationship between real exchange rates and FDI inflows. Table 3.1 presents a summary of the results for previous empirical studies. Obviously, there is still scope for future improvements beyond these empirical studies. One of such is to extend the attention outside the US, on which most of the previous empirical studies are based.

3.2.3. Labour costs

It is obvious that there is a causal link existing both ways between FDI and labour costs such as wages. The original theory of FDI has indicated that seeking low cost labour is an important motivation for MNEs to invest overseas. As the global competition of FDI intensifies, many developing countries such as China and India become very attractive for foreign investors because of their low labour costs.

There are a large number of papers exploring the relationship between labour costs and FDI inflows. Most of the studies provide evidence that labour costs significantly affect FDI levels. Barrell and Pain (1996) developed an econometric model to examine the determinants of FDI outflows by US MNEs over the 1970s and 1980s. They found that besides market size, both labour and capital costs are important determinants of investment decisions by MNEs.

On the other hand, the existence of foreign invested enterprises has significant implications on labour costs especially wage rates. Zhao (2001) used the data of state owned firms and foreign owned firms from China in 1996 to investigate the wage differences. His showed that employees in foreign-owned firms are paid a much higher rate than their counterparts with similar levels of education and skills in state-owned firms.

Whyman and Baimbridge (2006) investigated the interaction between labour market flexibility and FDI both in terms of the importance of the former as a key determinant of inward investment flows, and the impact the arrival of MNEs has upon the development of a flexible labour market using UK data generated from a questionnaire. The results indicate that the primary determinants of FDI are market-seeking factors, followed by resource- and asset-seeking labour market variables. And labour market flexibility was identified as a very important driver of FDI by nearly 60% of the respondents.

With more and more developing countries using low labour costs to attract FDI, concerns about labour standards have arisen. It is believed that some developing countries' low labour costs are achieved by low working/living standards (in terms of

employee rights). This could be an unfair advantage over other countries with high labour standards. Thus, some studies try to investigate the effects of labour standards on FDI location choice. Rodrik (1996) tested the 'conventional wisdom' that foreign investors are more likely to invest in low-standard countries. He used the manufacturing FDI outflow data from the US in 40 countries between 1982 and 1989 to test the relationship between labour standards and FDI inflows. Similarly, many other studies are trying to find some evidence regarding this 'conventional wisdom' (OECD, 1996; Freeman, 1996). However, none of those studies including Rodrik (1996) has found any evidence to support that hypothesis. Kucera (2002) extended the previous studies to employ a range of country-level indicators of core labour standards to test whether or not foreign investors favour countries with lower standards using alternative measures of labour standards as well as a larger sample of countries. Consistent with previous studies, Kuvera concluded that "one cannot correctly determine the effects of labour standards on FDI location solely by considering the labour cost-labour productivity nexus as a causal channel". In addition, this study shows that countries with more child labour and greater gender inequality do not have any comparative advantage in attracting FDI inflows. Sarna (2005) reported similar findings when looking at the relatively lower labour standards in East Asia and their roles in attracting FDI.

Similar studies about the labour costs' effect on FDI are also undertaken by Hill and Mundy (1992), Friedman et al. (1992), Janicki and Wunnava (2004), Ali and Guo (2005). There is no doubt that labour conditions including labour costs, unemployment rate and labour regulation are very important factors for a country to attract FDI. And the labour factor is still one of most common variables in the general equilibrium analysis of FDI decisions and locations.

3.2.4. Market

In the mainstream academic literature, market-seeking is one of the main purposes for MNEs to invest overseas. One of the motivations for market-seeking FDI is to avoid trade frictions and to better serve the local market. Another motivation is to occupy the market in host countries. For the latter one, market size or the growth rate of market size is a very important determinant for FDI. Market potential as a variable of firm's location choice decisions and production costs is introduced by Harris (1954). After that, many studies have focused on the market effects on FDI location decisions such as

Kravis and Lipsey (1982), Wheeler and Mody (1992), Milner and Pentecost (1994), Billington (1999). Usually GDP or economic growth (growth rate of GDP) is used as the proxy for market size or potential market size in host countries.

Meanwhile, market effect variables are considered in most general equilibrium analyses of the determinants of FDI. Barrell and Pain (1996) found that market size and factor costs are statistically significant determinants of US FDI outflows. Head and Mayer (2004) developed an empirical model of location choice under imperfect competition to examine the determinants of location choices by Japanese firms in Europe. The underlying profit equation incorporates a term that is closely related to the market potential index originally introduced by Harris (1954) to test the hypothesis that firms prefer to locate "where the markets are". The result shows that demand does matter for investors' location choice. In addition, a 10% increase in the market potential raises the chance of a region being chosen by 3% to 11%.

Redding and Venables (2004) used a bilateral trade equation to investigate the relationship between bilateral trade costs and each country's market and supply accessibility. They found that international inequality is closely linked to the differences in market access. After that, many studies have adopted a bilateral analysis method on economic growth and FDI (e.g., Hansen and Rand, 2004; Wijeweera et al., 2010). These studies have found that not only economic growth is related to FDI inflows, but FDI inflows also exert a positive impact on economic growth especially in developing countries.

3.2.5. Infrastructure

Infrastructure is another important variable that is believed to have a notable effect on FDI location decisions. Many previous studies have found significant correlations between measures of infrastructure and FDI inflows (Head and Ries, 1996; Coughlin et al., 1991; Kumar, 2001). However, there are only a few studies solely investigating the effect of infrastructure on foreign investment—it is usually common to include infrastructure variables in the general equilibrium analysis model.

Coughlin et al. (1991) developed a model of location decision of foreign firms investing in manufacturing facilities in the United States. The variables included in this study that

may affect FDI are labour costs, unemployment, infrastructure, and taxes. They showed that transportation infrastructures and promotional expenditures are positively associated with FDI.

Tung and Cho (2001) applied an econometric model for the determinants of FDI regional decisions for China. They included nine infrastructure variables as control variables and found that those nine infrastructure variables are highly related to FDI inflows in China. Similar results are also found by Tsen (2005) in testing the determinants of FDI in manufacturing industry in Malaysia.

Furthermore, Martin and Rogers (1995) suggested that public expenditures on domestic and regional infrastructure may have different impacts on the geographical distribution of FDI inflows due to economies of scale. According to this argument, foreign firms should prefer to invest in areas with better domestic infrastructure in order to take advantage of scale economy.

Meanwhile, there are many other studies that find no significant relationship between infrastructure and the distribution of FDI, such as Bronzini (2004) and Shepotylo (2006). Therefore, the empirical evidence on the influence of public infrastructure on the distribution of FDI decisions is conclusive. However, infrastructure development has gained increasing attention by many FDI host countries especially developing countries.

3.2.6. Trade

Previous studies on the effect of trade on FDI start with the examination of the relationship between export and foreign investment. Lipsey and Weiss (1981) investigated the effect of US and foreign affiliates on trade flows using a regression model to relate the exports by the US to 13 other countries. The control variables they used include market size, country dummies, and various measures of US and foreign affiliate activities. They found that the level of activities by US manufacturing affiliates is positively related to US exports and, negatively related to the exports by the other 13 countries. Lipsey and Weiss (1984) extended their previous study by removing some sources of possible bias when looking at exports and foreign investment activities on firm levels. The results confirm their findings in 1981 and show that the higher a firm's output in a foreign area, the larger its exports from the United States to that area.

Grubert and Mutti (1991) followed Lipsey and Weiss (1981 and 1984) to estimate the relationship between US controlled operations abroad and both US exports and imports using 1982 data on a cross-section of 33 countries. Clausing (2000) adopted a reduced-form approach to test the relationship between FDI and exports. Rather than using direct measures of FDI in their regressions, Clausing used variables that affect the costs of FDI. Most of those studies report a positive relationship between FDI and exports. However, Svensson (1996) found a negatively significant effect of export while investigating a Swedish firm's local production activities in a foreign country.

Head and Ries (2001) examined what happens to a firm's exports subsequent to the increases in its overseas investment by employing a panel dataset containing 25 years of data on 932 Japanese manufacturing firms. In addition, they incorporated year effects to control for external influences common to all firms. Their results appear to be consistent with most of the previous studies that exports increase with foreign investment. In a related study, similar results are also found by Blonigen (2001) and Swenson (2004) using product-level data for Japanese production in and exports to the US.

Foreign trade policies such as tariff are another area being concerned extensively (Belderbos, 1997; Ellingsen and Warneryd, 1999; Blonigen, 2001). However, there are relatively few empirical studies on the effect of trade protection because of the lack of relevant data.

3.3. Conclusion

This chapter reviews a large number of recent empirical studies on the determinants and economic growth effect of FDI. For studies on the determinants of FDI, this chapter mainly concerns research on what variables may affect MNEs' FDI decisions and how those exogenous factors, such as taxes and exchange rates, affect FDI inflows. Of course, there are some other factors such as geography, business climate and natural resources not discussed in this chapter as they only account for a small proportion of the literature.

For studies on the impacts of FDI on economic growth, existing literature has provided conflicting predictions concerning the effects of FDI[22]. Scholars supporting FDI having positive effects on economic growth believe that it could stimulate technological changes through the adoption of foreign technology and know-how and technology spillover, thus modernising host countries' economy. On the other hand, the opponents argue that FDI may result in 'crowding out' effect on domestic investment. These findings must be viewed sceptically, however, because existing studies do not fully control for simulation bias, country-specific effects as well as industry-specific effects. Generally speaking, the empirical literature on FDI study is still premature and most studies only focus on developed economies. With emerging countries starting to attract increasing amount of FDI inflows, those markets should justify a significant shift of attention in future research.

[22] Specifically, a detailed review of the crowding effects of FDI will be given in chapter.

CHAPTER 4
Research Methodology

4.1. Introduction

China has opened its market for more than twenty years since the start of economic reforms in 1979, and has become one of the world's fastest-growing economies. China has experienced real GDP growth at an average annual rate of 9.5% over the past two decades and has become the largest recipient of FDI among developing countries[23]. China's great success in economic development is to a large extent attributed to the 'opening-up and reform' policy. In order to attract FDI, the Chinese Government has introduced a dual corporate income tax system that gives foreign invested enterprises more favourable tax rates than domestic enterprises. As a result, FDI has become a major part in the opening up of China's industry and economic development.

Many previous studies believe low labour cost is the most important factor that accounts for the high FDI inflows in China. In this study, it is argued that besides labour cost, other factors such as economic growth, improved infrastructures, market potential and government's favourable policies also play crucial roles for FDI inflows. This thesis empirically investigates the factors that determine foreign investors' investment decisions in China (including location choice decisions and sector choice decisions) and whether the increasing FDI inflows have any crowding-out effect on China's domestic investment. Secondary data are used for empirical analysis in this study and they are mainly collected from the Urban Statistical Yearbook of China and China Economics Information and Statistics Database.

The aim of this chapter is to provide a brief introduction of the data sources and sample design for this study and discuss the general research approach applied in the empirical analysis. The structure of this chapter is as follows. Section 4.2 provides a brief review of the problems that need to be considered in this thesis. Section 4.3 introduces the data sources for the empirical analysis. Section 4.4 provides information for sample design

[23] Information from the Statistical Yearbook of China.

and section 4.5 gives some general discussions on the econometric approaches used in the research analyses.

4.2. Research Objectives

This section introduces the research objectives for this PhD study and the data needed in the empirical analysis for each objective.

The aim of this thesis is to empirically examine the determinants of FDI distribution in China and evaluate the impact of FDI on Chinese domestic investment. Derived from the general aim, some specific research objectives and issues will be addressed in order to develop the research design. Those three research objectives are summarised as below:

I. Investigate the factors that will significantly affect FDI location choice decisions in China using regional-level data;
II. Examine the determinants of FDI sector investment choice in the Chinese market using sector-level data;
III. Look at whether or not the increased FDI inflows in China since the 1990s have any displacement effect (crowding in or crowding out) on Chinese domestic investment using both regional-level and sector-level data in China.

There are two ways of data collection in the FDI research literature: primary data and secondary data. Primary data is collected by the researcher to meet the particular research objective of the relevant project and to reflect the direct information. The main advantage of primary data is that the data is 'first-hand', which is designed and collected for the particular research purpose. However, the obvious disadvantage is that the data collection is usually more costly, time consuming and less precise than secondary data. Secondary data is data used by the researcher from a variety of sources, internal or external. Some secondary data are collected and possibly processed by the researcher from questionnaires or surveys. Common sources of secondary data for social science include censuses, large surveys, and organisational records, which are difficult or even impossible to collect as primary data. The first major advantage of working with secondary data is economy. Because someone else has already collected the data, the researcher does not have to devote resources to this phase of research. The second major advantage of using secondary data is the breadth of data available. Data collected on a

national basis are particularly important in epidemiology and public health, fields that focus primarily on the whole population rather than individuals. It can (usually) provide a larger database than would be achieved when collecting on one's own (James and Sorenson, 2000). Other advantages of secondary data include providing directions for primary data collection, and serving as a basis of comparison for other data. However the disadvantages are also obvious, for example, the fact that the researcher cannot personally check the data so its reliability may be questioned. In addition, the data may not precisely fit the requirements of research objectives.

According to these research objectives, this study will use secondary data for empirical analyses as the data needed in the research is nation-wide, comprehensive and requires large time span. Table 4.1 summarises the data needed to undertake the empirical analysis for each objective. The data used in this study are obtained from *Urban Statistical Year book of China*, *China Economic Information and Statistics Database* and some of them are collected form *Statistics Yearbook of China* and FDI statistics from internet sources. The *Urban Statistic Yearbook* and *Statistics Yearbook of China* are official statistic databases for China and the *China Economic Information and Statistics Database* is a unique database for this study. Specifically, data used in FDI distribution analysis (chapter 5 and Chapter 6) are in nominal terms and those employed for displacement analysis (chapter 7) are in real terms which have been adjusted by inflation rate. For a considerably long period during the past decades, the inflation rate of China is closely monitored by the Government and has been artificially set at a low level so the use of inflation-adjusted data is less meaningful compared to other countries.

Table 4.1

Research objectives and the data required

Research Objectives	Ways of data collection used by previous studies	Required data for this study
I	Primary data: usually gathered for the first time by the researcher. This data sources use the latest data to show up-to-date information which usually applied for firm-level data analysis (e.g. Tischler et al, 2002)	**Secondary data**: City-level data that cover 300 cities from 34 provinces over a period of 18 years (1990-2007). Data items include FDI utilized, GDP, population, wage rate, infrastructure, corporate income tax rates, etc. for each city.
	Secondary data: obtained from some other organisations, databases or internet, which are usually used for the analyses of information related to a past period. Most empirical studies use secondary data for analyses.	
II	Primary data: usually used to analyse some specific sectors and applied in case study approaches (e.g. Panayides, Song and Nielsen, 2002).	**Secondary data**: Sector-level data for 14 different sectors over 18 years from 1991to 2008 to examine the determinants of FDI sectoral distribution. Other variables include market size, employment, wage rate, openness degree, exchange rate, etc.
	Secondary data: usually concern a large database and are applied to econometric analyses (e.g. Ho, 2004).	
III	Secondary data, although sometimes out-of-date, may be the only available source of the desired data on the subjects. Survey reports already collected by a business group can offer information but it is too difficult to collect the original data by someone's own.	**Secondary data**: Regional-level data and sector-level data including annual data for total amount of FDI, total domestic investment, total investment in fix asset, output, real GDP growth rate, etc, from 1991 to 2008.

4.3. Data sources

This section describes the data sources and the characteristics of the databases used in this study. This study uses secondary data and has collected both country-level and city-

level data of FDI in China over a period of 18 years for empirical analyses. As discussed before, most of the data in this research are obtained from Urban Statistical Yearbook of China (National Bureau of Statistics, PRC, 1990-2008 editions) and China Economics Information and Statistics Database. Therefore, this section will mainly introduce those two databases.

Urban Statistical Yearbook of China is an official statistical yearbook published annually by the National Bureau of Statistics of China (NBS). It provides information on China's economic development and social development of every city. This yearbook reports 655 cities' statistic data information in many aspects for the previous year. It mainly contains four parts:

1. An introduction on the administrative region division in China, the distribution and basic situation of cities for different areas and different administrative levels.
2. Statistical data for prefecture-level cities which consist of four sections: 1) the basic situation for every city including population, employment, natural resources and labour resources; 2) economic statistics for every city including comprehensive economic, agriculture, industry, investment in fixed assets, business, foreign trade, foreign investment, government financial, banking and insurance; 3) social statistical data for every city including labour costs, education, culture, medical treatment and health situation; 4) information on cities' environment and infrastructure including transportation, post and telecommunications, water supply, electricity supply, road, traffic situation and environment situation (such as pollution, forest area), etc.
3. Data on county-level cities including population, employment, natural resources, economics, major agricultural products, investment, commerce, education, medical treatment and so on.
4. Appendices providing some detailed information such as the definitions of economic indicators, the scope of statistics, statistical calibre, calculation methods and so on.

In addition, data recorded in the *Urban Statistical Yearbook of China* only cover Mainland China and do not include Hong Kong, Macao and Taiwan.

As the data included in the Urban Statistical Yearbook database are extremely comprehensive and involve almost every aspect of China's society and economy, it is

impossible for this paper to explain the detailed data collection process for each section. Here, I will generally introduce the statistical investigation system, how NBS divides the work of data investigation and management and the censorship system of the NBS.

Statistical investigations are arranged by the official approval documents of the NBS and implemented (or jointly-implemented) by departments, teams and census offices of the NBS and/or related departments of the State Council (administrative headquarters and head offices included)[24]. There are various statistical agencies under the central government at and above county level and related departments shall take responsibility to implement statistical investigation plans which can be classified into three different categories: national statistical institutions, departmental statistical institutions and local statistical institutions. The NBS also dispatches investigation teams every year throughout the country to collect related information, arrange related investigation meetings, check the original records and certificate relevant statistical data.

According to their different natures, statistical investigation projects can be divided into the following categories[25]:

1. By investigation frequency
    a. Periodical censuses that include censuses of population, basic units, industry, agriculture and the third (service) industry;
    b. Recurring investigations that include annual statistical investigations, regular statistical investigations and periodical ad hoc investigations;
    c. One-time investigations that include different kinds of pilot investigations, ad hoc investigations and interim investigations.
2. By form of organisation
    a. Independent investigations that refer to statistical investigations organised and implemented by the NBS itself;
    b. Joint investigations: statistical investigations jointly organised and implemented by the NBS and related departments of the State Council;
    c. Commissioned investigations: different kinds of statistical investigations commissioned by departments of the State Council, related institutions or social societies (paid or unpaid). Commissioned investigations are divided

[24] Information from National Bureau of Statistics of China website (www.stats.gov.cn).
[25] Quoted from "Administrative Provisions for Statistical Investigation Projects' Examination and Approval", National Bureau of Statistics of China (www.stats.gov.cn).

into 'mandatory investigations' and 'optional investigations'. Respondents could fill in forms or answer questions on the principle of voluntary for optional investigations, and respondents must make definite marks on questionnaires for mandatory investigations.

3. By type of investigation data
    a. Data mode: different kinds of statistical forms that are filled with statistical data and collected through various media, such as paper, telephone and magnetic medium and through networks.
    b. Writing form: different kinds of questionnaires that are designed in the form of Q&A or multiple choices and collected through various transmission modes.
    c. Mixed form: different kinds of statistical investigation forms that are filled with statistical data and information and collected through various transmission modes.

After the first-step of data-collection, in order to establish a scientific and consistent decision-making consultation mechanism, the NBS will set up a review panel for statistical investigation projects to check the accuracy and consistency of the data, discuss significant modifications and prepare summary records of the investigations.

China Economics Information and Statistics Database is a professional economic database which is developed by China Information Centre and Economic Information Network. This is a unique database for this study which is provided by the Nanjing University of Finance and Economics in China. It contains several sub-databases which can be divided into annual data and monthly data.

The content of the annual database include: 1) composite annual statistical data – data and indices for every aspect of national economy; 2) regional annual statistical data – data and indices for 31 provinces' economy; 3) annual city statistical data – data and indices for cities and towns' economy; 4) annual global statistical data – data and indices for world economy which mainly cover the data of 30 OECD (Organisation for Economic Cooperation and Development) member countries, 6 OECD non-member economic entities and major international economic organisations such as the European Union and North American Free Trade Organisation. The monthly database consists of:

1) composite monthly data – macro economy and regional economy indicators; 2) special subject monthly data –information on specific subjects such as real estate, banking and investment; 3) industrial monthly data – information on different industries' or sectors' monthly economic indicators.

This database is managed by China Economics Information Centre for the purpose of providing comprehensive data for empirical analyses and professional research. However, the sources of this database are also secondary data provided by other professional statistical organisations or related departments. The original sources for the China Economics Information and Statistics Database are listed in Table 4.2:

Table 4.2

Data sources for the China Economics Information and Statistics Database

Data	**Data sources**
Macroeconomic data	National Bureau of Statistics
Industry data	National Bureau of Statistics, State Economic and Trade Commission, Industry virtuous
Regional data	Local Bureau of Statistics
World economic data	World bank, International Monetary Fund
Import and export data	Customs Department
Financial data	Ministry of Finance
Banking data	People's Bank of China, National Foreign Exchange Bureau
Insurance data	China Insurance Regulatory Commission
Security data	Shanghai, Shenzhen Stock Exchange, China's Securities Regulatory Commission
Price and Price index	National Bureau of Statistics, State Development Planning Commission

Source: *National Statistic Bureau*

There are many advantages for choosing this database. First, the data are more reliable and accurate compared to primary data sources. The sources for this database are from authoritative institutions and collected by professional statisticians. In addition, any data collected is required to be checked before and after they are stored into the database. Second, the database is highly comprehensive which concerns almost every aspects of China's economy. It provides exhaustive information for this study which may be difficult to obtain individually. Third, the data and indices in this database meet the

requirement for time-series data analyses as one of the purposes for setting up this database is to provide information for research analyses. Fourth, it updates the latest information in a timely fashion with the changes in national and regional statistics. Finally, data collection from this database is highly automatic and allows remote access from anywhere with internet connections. It will save a large amount of time on data collection and data management for research studies. Moreover, it would be virtually impossible to collect such a wide range of data from a primary survey undertaken by individual researchers, who usually can only carry out a limited sample survey. However, there are still some drawbacks of this database. For example, most of the data in this database start from 1990, when extensive data collection and data management practice emerged in China. Another disadvantage is that given the general coverage of the database on the whole economy, information specifically on certain aspects of FDI may not be available.

4.4. Sample Design

This section will introduce the sample selection and sample design process for this study.

The sample period for this study is from 1990 to 2007 (or 2008 in a few cases). That is because China applied a dual corporate income tax system (i.e. lower income tax rate to foreign invested enterprises[26]) in this period in order to attract FDI. After then, the Chinese Government has revised the corporate tax rate for foreign invested enterprises and set it to the same level with domestic enterprises at 25% in 2008. This is the main reason why the sampling stops in 2007/08 as the dual corporate tax system forms a major tax incentive for foreign investors and is the basis for the investigation of the effect of tax on foreign investment decisions.

This study selects a sample of 300 cities to investigate the location choice of FDI in China. Those 300 cities cover most major cities in the eastern, middle and western areas of China. To minimise the impact of outliers or extreme effects, this study mainly selects major cities in every province. The sample selection is based on the following three principles: 1) province capitals and municipalities (Beijing, Shanghai, Tianjin,

[26] Domestic enterprises are subject to a tax rate of 33%; foreign invested enterprises' nominal tax rate is also 33% but they can take advantage of a series of tax benefit to reduce the income tax rate to 15% or 24%.

Chongqing) directly under the administration of the Central Government: municipalities and the capital of each province are obvious selections for empirical analyses because they are usually the most important cities to be considered for foreign investment; 2) prefectural-level cities: they are of a lower administrative level than province capitals/municipalities but higher than county-level cities; 3) random selections: some cities are randomly selected for the analysis. This study has attempted to balance the distribution of samples between the western and eastern areas while choosing sample cities. Table 4.3 and Table 4.4 report all the cities selected in this study and the geographical distributions of those cities. Cities located in the east (/middle) and west China account for 64% and 36% for the whole sample, respectively. The vast western areas have larger land areas, natural resources and a lower population compared to eastern areas. In addition, there are fewer tax incentive zones in the western areas than eastern areas.

Table 4.3

Sample city selection

Province	Cities	Region
Municipality	Beijing, Tianjin, Shanghai ,Chongqing(west)	East
Hebei	Shijiazhuang, Tangshan, Qinhuangdao, Handan, Xingtai, Baoding, Zhangjiakou, Chengde, Cangzhou, Langfang, Hengshui	East
Shanxi	Taiyuan, Datong, Yangquan, Changzhi, Jincheng, Suzhou, Jinzhong, Yuncheng, Qizhou, Linfen, Lvliang,	East/middle
Neimenggu	Huhehaote, Baotou, WuHai, Chifeng, Tongliao, E'erduosi, Hulunbei'er	West/middle
Liaoning	Shenyang, Dalian, Anshan, Fushun, Benxi, Dandong, Qinzhou, Yingkou, Fuxin, Liaoyang, Panqin, Tieling, Chaoyang, Huludao	East
Jilin	Changchun, Jilin ,Siping, Liaoyuan, Tonghua, Baishan, Songyuan	East/middle
Heilongjiang	Ha'erbin, Qiqiha'er, Jixi, Hekang, Shuangya, Daqing, Yichun, Jiamusi, Qitaihe, Mudanjiang, Heihe	East/middle
Jiangsu	Nanjing, Wuxi, Xuzhou, Changzhou, Suzhou, Nantong, Lianyunhang, Huai'an, Yancheng, Yangzhou, Zhenjiang, Taizhou, Suqian	East
Zhejiang	Hangzhou, Ningbo, Wenzhou, Jiaxing, Huzhou, Shaoxing, Jinhua, Quzhou, Zhoushan, Taizhou, Lishui	East
Anhui	Hefei, Wuhu, Bangbu, Huainan, Ma'anshan, Huaibei, Tongling, Anqing, Shuangshan, Chuzhou, Fuyang, Chaohu, Liu'an	East/middle
Fujian	Fuzhou, Xiamen, Putian, Sanming, Quanzhou, Zhangzhou, Nanping, Longyan, Ningde	East
Jiangxi	Nanchang, Qingdezhen, Pingxiang, Jiujiang, Xinyu, Yingtan, Ganzhou, Ji'an, Yichun, Fuzhou, Shangrao	East/middle
Shandong	Jinan, qingdao, Naobo, Zaoshuang, Dongying, Yantai, Weifang, Qining, Tai'an, Weihai, Rizhao, Laiwu, Linyi, Dezhou, Liaocheng, Binzhou	East
Henan	Zhengzhou, Kaifeng, Luoyang, Pingdingshan, Anyang, Hebi, Xinxiang, Jiangzuo, Puyang, Yuchang, Sanmenxia, Nanyang, Shangqiu, Xinyang, Zhoukou	East/middle
Hubei	Wuhai, Huangshi, Shiyan, Yichang, Xiangfan, e'zhou, Xiagan, Jingzhou, Huanggang, Xianning, Suizhou	East/middle
Hainan	Haikou, Sanya	East
Hunan	Changsha, Zhuzhou, Xiangtan, Hengyang, Shaoyang, Yuezhou, Changde, Zhangjiajie, Yiyang, Chenzhou, Yongzhou, Huaihua, Loudi, Shaoguan	East/middle
Guangdong	Guangzhou, Shenzhen, Zhuhai, Shantou, feshan, Jiangmen, Zhenjiang, Maoming, Zhaoqing, Huizhou, Meizhou, Shanwei, Heyuan, Yangjiang, Qingwan, Dongwang, Zhongshan, Chaozhou, Jieyang	East

Table 4.3 (Continued)

Guangxi	Nanjing, Guizhou, Guilin, Wuzhou, Beihai, Fangchenggang, Qinzhou, Guigang, Yulin, Baise, Hezhou, Hechi, Laibin, Chongzuo	West
Sichuan	Chengdu, Zigong, Panzhihua, Luzhou, Deyang, Mianyang, Guangyuan, Suining, Neijiang, Leshan, Nanchong, Meishan, Yibin, Guang'an , Dazhou, Ya'an, Bazhong, Ziyang	West
Guizhou	Guiyang, Liupanshui, Zunyi, Anshun, Tongren, Bijie, Qianxi	West
Yunnan	Kunming, Qujing, Yuxi, Baoshan, Zhaotong, Lijiang, Simao, Lincang, Wenshan, Xishuangban'na, Dali	West
Tibet	Lasa, Changdu, Shannan, Rikeze, Naqu, A'li, Linzhi	West
Shanxi	Xi'an , Tongshuang, Baoji, Xianyang, Weinan, Yan'an, Hanzhong, Yulin, Ankang, Shangluo	West
Gansu	Lanzhou, Jiayuguan, Jinchang, Baiyin, Tianshui,Wuwei, Zhangye, Pingliang, Qiuquan, Qingyang, Dingxi, Longnan, Linxia, Gannan	West
Qinghai	Xining, Haidong	West
Ningxia	Yinchuang, Shizuishan, Wuzhong, Guyuan, Zhongwei	West
Xinjiang	Wulumuqi, kelamayi, Tukufan, Hami, Jichang, Kezile, Keshen, Hexian, Yili, Tacheng, A'taile	West

Note: There are two types of regional classifications in China. The first one classifies all cities into either eastern or western cities (this is a classification according to both geography and economy development). And the other one divides all cities into three categories: east, west and middle according to only geographic locations.

Table 4.4

Distribution of sample cities

	Eastern	Western	total
Total number of Observations	193 (64%)	107 (36%)	300
Tax incentive cities	118	25	143
Size of the territory ('000 km^2)	4,200	5,400	9,600
Population (million)	291.36	79.61	370.97

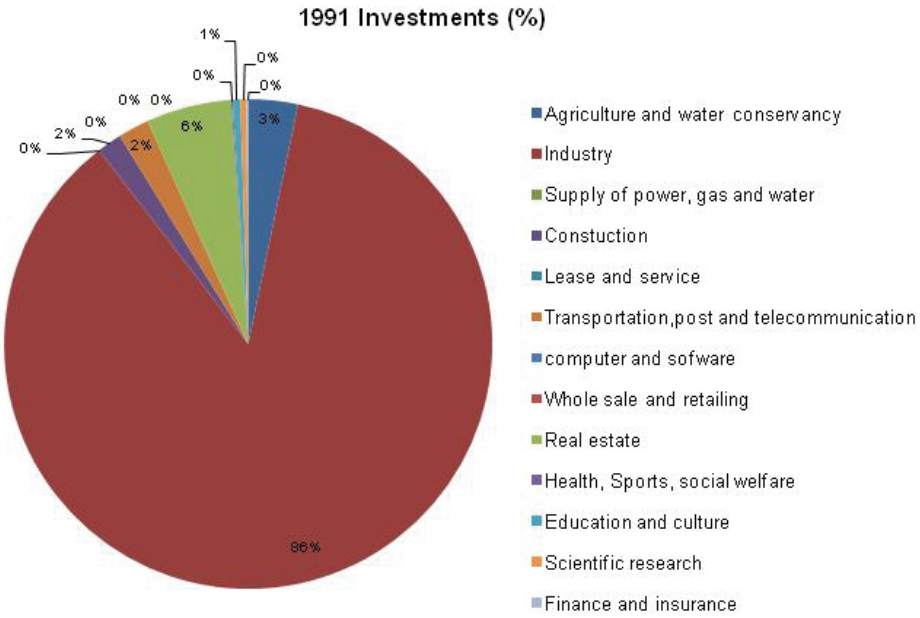
For sector-level research, this study has selected a sample of 14 sectors which most foreign enterprises invest in to examine the factors that affect FDI sector choice decisions. The sample period is also from 1991 to 2007/08. According to the official

industry classification by the NBS, these sectors include: agriculture, industrial, energy, gas and water, construction, lease and services, transportation, post and telecommunication, computer and software, whole sale and retailing, real estate, health, sports, social welfare, education and culture, scientific research, finance and insurance. Some sectors did not allow foreign investment in early years but were subsequently opened to foreign investors later on, especially after China's entering into the WTO[27]. Moreover, the distribution of sectors invested by foreign capital has changed a lot for the period 1990-2008. At the start of this period, most FDI is concentrated in manufacturing and the investment extended to other fields of the economy gradually with China's economic reform. However, sectors in the manufacturing industry[28] are still the most important sectors that attract foreign investment. Figure 4.1 shows the FDI distributions by sectors in 1991 (Figure 4.1.A) and 2007 (Figure 4.1.B).

Figure 4.1

Sector distribution of FDI in 1991 and 2007

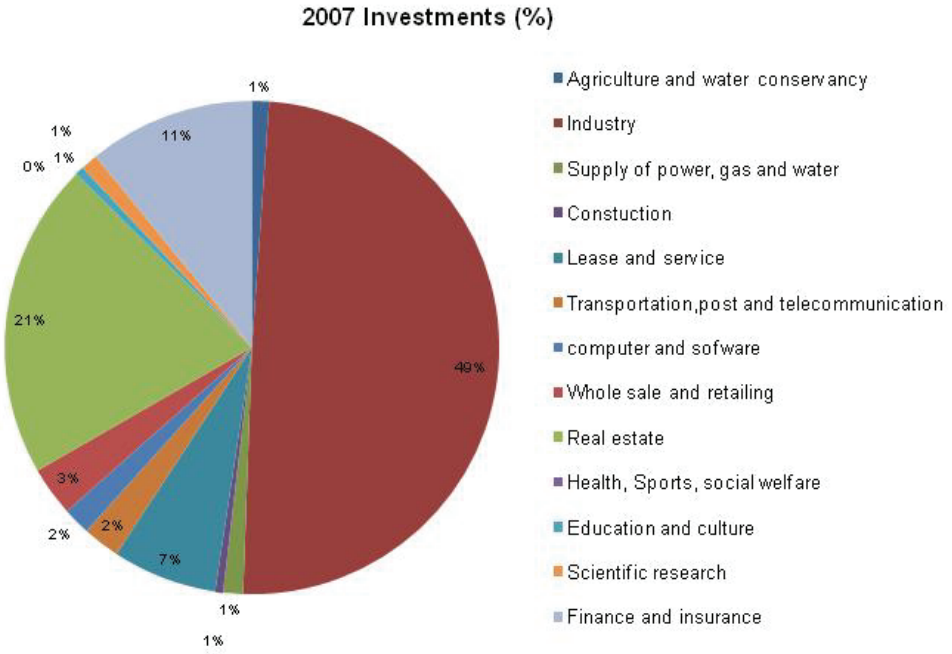
Figure 4.1.A. 1991 Investments



[27] After entering into the WTO, the Chinese Government has removed or reduced entry restrictions to some sectors, such as insurance, banking, telecommunications, services, retailing, transportation and construction.

[28] This includes industrial, energy, gas and water, and construction.

Figure 4.1.B. 2007 Investments



Sources: *Statistic Yearbook of China* (1991, 2008)

4.5.Analytical Approach

This section discusses the research approach used in the empirical analysis to address the research objectives in this study. It also introduces the econometric package used in the empirical analyses.

4.5.1. Research approach selections

The research questions determine the requirement for the research approach. Answering the research questions in this study requires empirical analyses based on large-scale samples or observations. Therefore, this study utilises quantitative approaches that draw on a large-scale dataset to examine hypotheses and derive conclusions. The reason for selecting quantitative methods is that this study attempts to find the links between the increasing FDI and China's economic situation or government policies in a statistically robust way, which can only be achieved through numerical or quantitative methodologies. First, this research involves undertaking the statistical analyses of numerical data to investigate the quantitative relationships between variables. Second, quantitative analyses are essential in developing and employing mathematic models,

theories, or hypotheses to explain market phenomena and provide evidence of possible connections between empirical observations as set up in the aims of this study.

Moreover, the strengths of the quantitative method can be summarized as the follows:

- Frankfort-Nachmias & Nachmias (1992) pointed out that quantitative methods can illustrate the research problem in very specific and set terms;
- It shows the fundamental connection between empirical observations and mathematical expression of quantitative relationships;
- It gives clear and precise investigations to both independent and dependent variables;
- This method is widely used to follow research aims, achieve research objectives, test hypotheses and find evidence of causality;
- Quantitative methods could provide a high level of measurement precision and statistical power compared to qualitative method;
- Quantitative methods are more likely to eliminate or minimise subjectivity of judgment (Kealey and Protheroe, 1996);
- It provides longitudinal measures to control for the subsequent performance of research subjects.

The process of measurement is central to quantitative research because it provides the fundamental technique to investigate the relationship between the empirical variables. A series of previous studies from the 1980s have investigated FDI decision making. The main quantitative approaches they used are: 1) estimate the impact of various measures of corporate taxation on FDI inflows level or location choice; 2) consider cross sectional variations and/or time-series variations in FDI inflows; 3) bilateral analyses on flows of FDI between countries; 4) approaches more relevant for policy purposes; 5) examine the geographical distributions of FDI and its determinants from an aggregate level. Table 4.5 shows a summary of alternative approaches for FDI research usually used by previous empirical studies.

Table 4.5

Summary of alternative approaches

Main approaches	Empirical studies	Approach emphasises
Investigate FDI flows with time-series variation	Hartman (1984)	Taxation effects on level of FDI inflows.
	Boskin and Gale (1987)	An extension of Hartman's paper but uses different measurement of taxation or updates data period
	Newlon (1987)	
	Young (1988)	
	Murthy (1989)	
	Slemrod (1990)	Control effects of the home country's tax system for FDI
Panel of FDI inflows	Billington (1999)	FDI location determinants on country-level and region-level.
	Young (1999)	Foreign factor prices and international corporate taxation on fixed investments.
Location choices of multinationals or foreign investment	Grubert and Mutti (1991)	Taxation and multinational corporate investment decision makings
Cross-sectional allocation of assets of US multinationals, by affiliate	Wheeler and Mody (1992)	Market effects on FDI location decisions.
	Grubert and Mutti (2000)	Host country's tax effects on US multinational corporations' investment location choices.
Cross-sectional allocation of assets of US multinationals, by location or industry	Grubert and Mutti (1991)	Relationship between U.S. controlled operations abroad and U.S. exports and imports.
	Hine and Rice (1994)	Firms' business activities between high-tax foreign countries and low-tax foreign tax havens
	Hines (1996)	Consider the double tax relief in multinationals' location choice.

Source: author's own summary.

The most widely used quantitative methodology is multinomial regression analysis. Based on previous studies' approaches and the data structure of this study, this thesis aims to extend previous research on FDI regional choice decisions and cross-sectional variation in FDI flows as well as FDI displacement effects using panel data analyses. The preference of panel data models over other models such as ordinary least squares (OLS) is based on the two reasons.

Firstly, OLS models are usually used on data pooled across groups/observations and implicitly assume that unobserved group factors do not exist. These unobserved group effects can arise both from cross-sectional differences between groups (e.g. sectors, regions) as well as variations within variables from time to time. Assuming constant coefficients between groups and over time can result in incorrect parameter estimates if

there is variation in the intercepts and mean levels of the independent variables across companies. Missing variables can also constitute a problem if they are company specific, as opposed to randomly distributed within, and across, groups (an assumption of pooling). Therefore, OLS is less applicable to the data analysis with both spatial and temporal dimensions, as in this study.

Secondly, it is important for the empirical analysis of the Chinese market to take the time-series nature of the data into consideration due to the significant changes in FDI inflows and economic situations over time. For the above reasons, one of the principal empirical methodologies used in this study is the panel data model. Panel data can combine both the time-series and cross-sectional natures of the data into the economic model and enable researchers to study the behaviour of FDI decisions and their effects over time and between different groups, which can enhance the quality and robustness of data analyses compare to OLS. Compared to a pooled, cross-sectional analysis, the fundamental advantage of panel data models is that it will allow the researcher greater flexibility in modelling differences in behaviour across individuals. Moreover, researchers will be able to use panel data models to examine issues that could not be studied in either cross-sectional or time-series settings alone.

4.5.2. Panel data analysis

This section outlines the basic structure of panel data and discusses a series of econometric approaches which have been employed to estimate models with data of this type.

Panel data analysis is a method of studying a particular subject within multiple sites, periodically observed over a defined time frame. Within the social sciences, panel analysis has enabled researchers to undertake longitudinal analyses in a wide variety of fields. In economics, panel data analysis is often used to study the behaviour of companies over time. With repeated observations of enough cross sections, panel analysis permits the researcher to study the dynamics of change with (often short) time series. The combination of time series with cross sections can enhance the quality and quantity of data in ways that would be impossible using only one of these two dimensions. For this study, panel analyses provide a robust framework for exploring the

performance of FDI and the displacement effects of FDI inflows, as we consider both the space and time dimension of the data.

Panel data sets generally include sequential blocks or cross sections of data, within each of which resides a time series. Apart from the variable number, the data structure confers upon the variables two dimensions. They have a cross sectional unit (*group identifier*) of observation, which in this case is region/sector *i*, and they have a temporal reference (*within-group index*), *t*, in this case the year. Due to the possible group specific effects, heteroskedasticity may exist across panel units. In the context of this study, the error term has two dimensions, one for the location/sector and one for the time period. The basic framework for this discussion is a regression model of the form:

$$Y_{it} = X'_{it}\beta + Z'_{i}\alpha + \varepsilon_{it}, i = 1,..., N, t = 1,..., T \qquad (4\text{-}1)$$

There are *K* regressors in X_{it}, not including a constant term. The individual effect is $Z'_i\alpha$ where Z_i contains a constant term and $1 \times p$ vector of time-invariant variables that only vary over individuals, which may be observed, such as race, sex, location, sector, etc. If Z_i is observed for all individuals, then the entire model can be treated as an ordinary linear model and fit by least squares. Moreover, if there are no missing values (i.e. *T* observations within each of the *N* individuals), the data set is called a balanced panel, but if there are missing values among individuals, the data set is referred to as an unbalanced panel. For this study, as it uses the data of different cities and sectors with missing data, the data are by construction unbalanced panels.

There are several types of panel data analytic models. The two specifications most commonly used are *fixed-effects* models (FE), and *random-effects* models (RE). Both models allow for heterogeneity across panel units but confine that heterogeneity to the constant terms in the regression. This reflects the fact that models have to be estimated by methods that handle the problems afflicting them:

Fixed Effects: If *Zi* is unobserved, but correlated with X_{it}, then the least squares estimators are biased and inconsistent as a consequence of omitted variables. In this case, the model

$$Y_{it} = X'_{it}\beta + \alpha_i + \varepsilon_{it} \quad (4\text{-}2)$$

where $\alpha_i = Z'_i \alpha$, embodies all the observable effects and specifies an estimable conditional mean. The error term, ε_{it}, contains and individual level effect which is correlated with the regressors, and a common disturbance term. This fixed effects approach takes α_i to be a group-specific constant term in the regression model. It should be noted that the term 'fixed' as used here signifies the correlation of ε_{it} and X_{it}, not that ε_{it} is non-stochastic.

The estimation of the FE model usually involves a 'within-group transformation'. By removing panel-level averages from each side of Eq (4-2), the fixed effects from the model can be eliminated. In this way, OLS estimations on the within-group transformed data will produce consistent estimates of β and the estimators are thus termed *within estimators*. The model can easily adjust for time-specific effects by including a set of time indicator variables in the regression (if the number of period is reasonably small, which is the case in most studies). The significance of the time effect can be checked by a joint test that all the coefficients on the time indicators are zero.

Random Effects: If the unobserved individual heterogeneity, however formulated, can be assumed to be uncorrelated with the included variables, then the model is a *random-effects* model and can be formulated as:

$$Y_{it} = X'_{it}\beta + \alpha + u_i + \varepsilon_{it} \quad (4\text{-}3)$$

that is, as a linear regression model with a compound disturbance that may be consistently, albeit inefficiently, estimated by least squares. This random effects approach specifies that u_i is a group-specific random element, similar to ε_{it} except that for each group, there is but a single draw that enters the regression identically in each period. Here the general least squares (GLS) model is usually used to estimate RE models.

Generally the FE model is more appropriate as it is relatively unrealistic to assume no correlation between the error term and individual observations in a panel data setting.

However, there are two main empirical drawbacks to the FE model. First, it can use up degrees of freedom as it introduces new parameters into the model. Second, variables that are fixed over time cannot be included, and variables that only change slowly over time are likely to have large standard errors. The alternative is the RE model. The crucial distinction between fixed and random-effects is whether or not the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not. However, the random-effects specification has been criticised by Mundlak (1978) because it ignores the "possible correlation between the explanatory variables and the (individual-specific) effects". In this study, a Hausman[29] test (Hausman 1978) on the validity of the extra orthogonality conditions imposed by the RE estimator is used to choose between FE and RE model, and then I consider possible extensions to a dynamic panel data model.

4.5.3. Dynamic panel data models

This study also uses dynamic panel analysis for the last two research chapters. Dynamic panel data (DPD) is now also widely used to estimate dynamic econometric models. This is particular important if lagged dependent variables are included in the static FE or RE model, as by construction the lagged dependent variable is correlated with the error term and static panel data models will yield biased (and possibly inconsistent) estimates.

The dynamic panel data models solve the above problems by considering the possibility that underling microeconomic dynamic which may be obscured by aggregation biases (Nickell, 1981), and investigating heterogeneity between different types of individuals from another perspective. The dynamic modelling is usually applied for the following two situations: 1) temporal autocorrelation in the residuals ε_{it}; and 2) high persistency in the dependent variable y_{it}.

In examining dynamic effects in the data, consider the following first-order model:

$$\begin{aligned} Y_{it} &= X'_{it}\,\beta + \delta y_{i,t-1} + C_i + \varepsilon_{it} \\ &= W'_{it}\,\theta + \alpha_i + \varepsilon_{it} \end{aligned} \tag{4-4}$$

[29] Hausman, J.A., 1978. Specification Tests in Econometrics, Econometrica, 46 (6), 1251–1271.

where the set of right-hand-side variables, W_{it} , now includes the lagged dependent variable[30], $y_{i,t-1}$. Adding dynamics to a model in this fashion creates a major change in the interpretation of the equation. Without the lagged variable, the independent variables represent the full set of information that produce observed outcome y_{it}. With the lagged variable, we now have in the equation the entire history of the right-hand-side variables, so that any measured influence is conditioned on this history.

In both the fixed and random effects settings, the difficulty is that the lagged dependent variable is correlated with the disturbance, even if it is assumed that ε_{it} is not itself auto-correlated. A solution to this auto-correlation problem is to take first differences on both the left- and right-handed sides of Eq (4-4). This first difference transformation will remove both the constant term and the individual effect in the error term ε_{it}. By removing the individual FE, an instrumental variable estimation can now be used and this is the original DPD approach of Arellano and Bond (1991). Arellano and Bover (1995) and Blundell and Bond (1998) further developed the model to address the potential weakness of the original Arellano-Bond estimator. This is done by including lagged 'level' instruments in addition to the lagged difference instruments. Both models use generalised methods of moments (GMM) estimators and the earlier one is termed difference GMM and the later one system GMM. This study will use the system GMM estimators proposed Arellano and Bover (1995) and Blundell and Bond (1998) in the empirical analyses.

The econometric package used in this study is Stata (version 11). Stata is an integrated statistical analysis package design for research professionals. The official website is http://www.stata.com/. Its main strengths are handling and manipulating large data sets (e.g. millions of observations), and it has ever-growing capabilities for handling panel and time-series regression analysis. It now also has pretty flexible graphics capabilities. It is also constantly being updated or advanced by users with a specific need. Stata is chosen for several reasons including but not limited to: first, it is a command-driven package, second, it is a versatile program that can read different formats of data and third, information in Stata is usually and most efficiently stored in variables.

4.6.Conclusion

[30] The order of the lag can vary.

In conclusion, this study will use a factor-based approach and panel data analysis to investigate the determinants of foreign investor's investment decisions over time including location distribution and sector distribution. In addition, this study will test the displacement effects of FDI on China's domestic investment at both regional level and sector level. The detailed analytical methodologies will be discussed in details in the next three empirical research chapters.

CHAPTER 5

The Determinants of Geographical Location of FDI: An Empirical Analysis in China

5.1. Introduction

Today, the role of foreign direct investment in the global economy is becoming increasingly important with market integration and globalisation. Many countries take different measures to attract FDI. Consequently, the effects of tax and non-tax factors on FDI have become an interesting research topic in the last twenty years. Several previous studies (Hartman, 1981 and 1984; Boskin and Gale, 1987; Slemrod, 1990) have demonstrated that domestic tax rates are at least partially responsible for FDI inflows by using time-series models. In addition, some other prior studies, such as Papke (1987), Hines (1996) and Billington (1999), tested the relationships between tax/non-tax factors and the regional distribution of FDI. Most of their results show that tax rates significantly affect the allocation of FDI. However, the majority of these studies in this area are focused on developed market and few of them consider developing countries and China in particular.

China has been one of the most popular countries for FDI in the last two decades. For most of the 1990s China counted for over 50% of FDI inflows into developing countries, and has been the second largest recipient of FDI in the world since 1994 (Huang, 2003). Clearly, the Chinese Government has achieved great success in attracting FDI since the 'opening up' policy started in 1978 especially since the tax reforms in the 1990s. Therefore, it provides a good example for research into the relationship between FDI and tax incentives.

Throughout the 1980s, different corporate income tax laws and different tax rates were applied to three different forms of FDI[31]. Due to economic development and ever-increasing competition in the global market, the Chinese Government published the new

[31] These are equity joint ventures, contractual joint ventures and wholly foreign owned enterprises.

corporate income tax law in 1991 to unify income tax regimes for all forms of FDI[32], which granted more concessionary tax rates to foreign invested enterprises (FIEs). At the same time, a number of tax incentive zones have been set up gradually by the Chinese Government since early 1980s. In addition, China has experienced fundamental changes and reforms including its policy, investment environment, infrastructure, education, and so on.

The aim of this chapter is to investigate what factors will significantly affect FDI location choice decisions in China using a sample of 300 cities in China from 1990-2007. This aim will be examined by the following objectives:

i. Investigate the extent to which the Chinese Government's incentive policies for FDI (such concessionary tax rates and special tax incentive zones) have significant effects on the regional distribution of FDI in China.
ii. Examine the role of other factors besides tax policies (such as infrastructure, market size, labour costs and availability, education, regional differences, etc.) in influencing the location decisions of FDI in China.
iii. Examine whether or not the concessionary tax rates have similar impacts on the eastern and western cities in China.

This chapter extends from previous studies by the following aspects: 1) using a more comprehensive dataset (larger sample and longer period) for empirical analyses – an extended sample period from 1990 to 2007 and a sample consists of over 300 cities from all 34 provinces, which is the most comprehensive data set so far; 2) incorporating regional factors to compare the tax effects in different regions: this study is among the first to take regional factors, or specifically, the difference in eastern and western areas[33], into consideration; 3) undertaking a more comprehensive general equilibrium analysis for FDI in China. Moreover, in order to improve the quality of data and refine the analyses to consider both the space and time dimensions of the data, this study uses both OLS and panel data estimations in the regression specifications.

The findings from the empirical analysis are consistent with the main hypothesis (H1) that tax incentives have a significant effect on FDI location choice, and cities with

[32] National People's Congress (1991).
[33] Provinces in China are divided into eastern and western provinces officially according to China's economic statistic database.

concessionary tax benefits and more favourable tax rates are expected to attract more FDI than other cities. Furthermore, the regression results also support the hypothesis (H2) that the location of a city (eastern or western area) has a significant effect on FDI inflows.

The rest of the chapter is organised as follows. Section 5.2 discusses the theory of FDI location choice and the background of China's tax incentives. Section 5.3 is a review of related previous studies. Section 5.4 lays out the theoretical foundation of FDI location choice decisions. Section 5.5 develops the hypotheses and the empirical methodology used to test them. Section 5.6 describes the data source and sample statistics. Section 5.7 presents the empirical results. The final section concludes the chapter.

5.2. Tax Incentives for FDI

China has achieved considerable success in attracting FDI since its opening to the outside world in 1979. Undoubtedly, the tax incentive policies taken by the Chinese Government have played a very important role in attracting FDI inflows. This section will discuss the background of this research. It introduces the concessionary income tax regimes for foreign invested enterprises and the development of the special tax incentive zones in China since early 1980s.

5.2.1. Income tax laws for different forms of FDI

There are three main forms of FDI in China: equity joint ventures, contractual joint ventures and wholly foreign-owned enterprises. Table 5.1 outlines the differences between each form, which is summarised from the detailed discussion in Chapter 2. Both equity joint ventures and contractual joint ventures involve investments by both domestic and foreign participants. The former requires joint investment and management, and the sharing of profits and losses according to the proportion of their investment. The latter would usually involve a formal contract for the cooperation and an agreed share of the profits and losses according to the venture contract. Wholly foreign-owned enterprises are set up by the foreign companies using their own capital and all the risks, gains and losses are self-financed. Other forms of investments include compensation trade[34], processing trade[35] and assembling trade [36]which only occupy a

[34] Under a compensation trade arrangement, the Chinese provide the plant and labour while the foreign firm provides the technology, equipment, technical expertise, and management.

small proportion of total amount of FDI in China so are not the main concerns for this study.

Table 5.1

Different forms of FDI in China

	Equity joint ventures	Contractual joint ventures	Wholly foreign-owned enterprises
Organisation forms	Limited liability corporations	May or may not form as legal entities	Corporation or other forms of legal entities
Investment	jointly investment and management; require 25% foreign minimum participation	No minimum foreign participation requirement	Established by foreign companies using their own capital, technologies and management entirely
Profit and loss distribution	Losses and profits are shared according to the proportion of investment	Losses and profits are shared according to the venture contract	Response for all the risks, gains and losses by themselves

Source: National People's Congress (1991).

Throughout the 1980s, different corporate income tax laws were applied to three different forms of FDI. In order to create a more friendly investment environment and to encourage overseas firms to invest in China, the Chinese Government unified the corporate income tax laws by introducing the '*Income Tax Law for Enterprises with Foreign Investment and Foreign Enterprise*' in 1991[37]. This law replaced both the 1980 and 1981 tax laws (National People's Congress, 1980 and 1981) which imposed the same tax rates and incentives to all three forms of FDI. Under the new legislation, foreign invested enterprises are charged at a base rate of 30% with a possible surcharge of 3% at the discretion of local authorities. However, FIEs are able to take advantage of an extensive range of incentives according to different economic sectors and

[35] Processing trade refers to the business activity of importing all or part of the raw and auxiliary materials, parts and components, accessories, and packaging materials from abroad in bond, and re-exporting the finished products after processing or assembly by enterprises within the mainland. It includes processing with supplied materials and processing with imported materials.
[36] Assembling trade is very similar to processing trade, but assemble parts for the clients and process according to the clients' samples.
[37] National People's Congress (1991).

geographical areas. Table 5.2 shows the detailed tax incentives for different forms of FIEs. Firms in the manufacturing sector can be exempted from paying any tax for the first two years of making an operating profit and a 50% reduction in the standard tax rate for three years thereafter. In addition, other tax benefits to foreign firms include a further reduction in income tax of 15% to 30% for ten additional years after the initial five years for firms engaged in low-profit operations and located in underdeveloped areas, and a refund of up to 40% of the income tax paid on the amount of profits if the FIE reinvest its share of profit in China for a period of five years or more. Furthermore, firms located in designated special tax incentive zones such as Special Economic Zones, Economic and Technological Development Zones or Open Coastal Cities may be eligible for a concessionary tax rate at the base of 15% or 24%.

Table 5.2

Tax incentive for FIEs

Types of FIE	Tax Incentives
FIE engaged in manufacturing sector	Exemption from income tax for the first two-profit-year and a 50% reduction for 3years thereafter;
Firms engaged in low-profit operations and located in underdeveloped areas	A further reduction in income tax of 15%-30% for 10 additional years following the initial 5 years tax concession period;
For export-oriented FIE	Reduction of 50% in income tax if they export more than 70% of their total production value
Designated special tax incentive zones	Offer a concessionary tax rate of 15% or 24%
For firms reinvest its profits to increase capital	Refund of 40% of the income tax paid on the amount of reinvested profits

Source: Economist Intelligence Unit (1997); Tung and Cho (2000); Income tax Law for Enterprises with Foreign Investment and Foreign Enterprise (1991).

5.2.2. Special tax incentive zones in China

In 1979, the Chinese Government established the policy of 'reform and opening up'. As a result, in the twenty years that followed, a number of special tax incentive cities and zones have been set up to attract FDI as a reaction to the 'opening-up' policy. Those tax inventive cities and zones offer more liberal investment and trade regimes than other areas, as well as special concessionary tax rates of 15% or 24% to FIEs. Since then, they

have played an important role in attracting FDI and made great contributions to the economic development of China.

Table 5.3 presents the opening years and tax rates applied for different tax incentives zones. In 1980, China opened four coastal cities in the south (Shenzhen, Zhuhai, Shantou and Xiamen) as Special Economic Zones which marked the first steps of 'opening up'. Hainan province became the fifth Special Economic Zone in 1988. In 1984, another 14 coastal cites (Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang, Beihai) were opened to foreign investors in order to attract foreign capital and advanced technology and management. In the following year (1985), three areas were designed as Economic Coastal Open Zones including the Yangze River delta, the Pearl River delta and the Zhangzhou-Quanzhou-Xiamen region. Furthermore, two more peninsulas were included into the Coastal Open Zones in 1988. Those Coastal Open Zones cover 10 provinces form the north to south (Guangdong, Fujian, Zhejiang, Jiangsu, Shanghai, Shangdong, Tianjin, Hebei, Liaoning, Guangxi). In June 1990, the Shanghai Pudong New Area was opened to overseas investments. In 1992, the Chinese Government took further steps to open 18 Provincial Capital (Urumchi, Nanning, Kunming, Harbin, Changchun, Huhehot, Shijiazhuang, Taiyuan, Hefei, Nanchang, Zhengzhou, Changsha, Guiyang, Xi'an, Lanzhou, Xining, Yinchuan, Chengdu) and six cities (Wuhan, Wuhu, Hongqing, Yueyang, Jiujiang, Huangshi) along the Yangze River as well as 13 Border Open Cities (Heihe, Suifenhe, Hunchun, Manzhouli, Erenhot, Yining, Tacheng, Bodong, Pingxiang, Wanding, Hekou shi, Ruilixian, Dongxingzhen). Moreover, since 1992 the Chinese Government has set up many Economic and Technology Development Zones and New and High Technology Industrial Development Zones in order to encourage the development of high-technology industries. In 2000, as the strategy of encouraging western development was implemented, opening-up expanded further to the western region of China. Thus, a pattern of multi-dimensional development of open regions has been shaped. Now China has formed a multi-level, multi-channel and all-direction pattern of economic liberalisation which integrates coastal areas, border and inland areas. And the special tax incentives cities and zones have been expanded from the south to the north and from the coastal regions to the inner and western parts of China.

Table 5.3

Investment incentive zones and their concessionary tax rates

Tax incentive zones	Year of opening	Concessionary tax rates
Special Economic Zones (5 zones)	1980, 1988	15% for all FIEs
Coastal Open cities (14 cities)	1984	24% for FIEs in production industries
Economic Coastal Open Zones (10 cities)	1985,1988	24% for FIEs in production industries
Ecnomic and Technology development Zones (32 cities)	Since 1992	15% for FIEs in production industries
New and high Technology industrial Development Zones (52 zones)	Since 1992	15% for FIEs in high-technology industries
Provincial capitals and Open cities along Yangtze River (24 cities)	1992	24% for FIEs in production industries
Border Open cities (13 cities)	1992	24% for FIEs in production industries

Source: Cho and Tung (1998),
State Administration of Taxation, P.R.C. (http://www.chinatax.gov.cn/n8136506/index.html)

Those tax incentive cities and zones play a crucial role in attracting FDI and promoting the development of China's economy. Within a short period of 30 years, the total volume of FDI in China has experienced a dramatic increase from almost zero in 1978 to USD74.8 billion[38] in 2007. China has become one of the largest recipient countries of FDI, and ranked the first among developing countries for 16 consecutive years.

However, FDI is unevenly distributed across China. Most of FDI is still located in the eastern and coastal areas of China, which account for about 85% of the total amount of FDI. The inner and western areas of China only account for 7.6% and 6.0%, respectively [39]. Chen, Chang and Zhang (1995) suggested that the unbalanced distribution of FDI can be explained by many factors such as degree of openness, infrastructure, population etc. Sun, Tong and Yu (2002) argued that main driver of FDI in China is the potential market for foreign products and low labour costs, rather than natural resources.

5.3. Review of Related Previous Studies

[38] Measured in actually-utilized investment.
[39] Statistics Yearbook of China (2002).

This Section provides a review of previous studies on the determinants of FDI location choice, including tax and non-tax factors.

5.3.1. Tax and FDI inflows

There are different views from previous empirical research on tax rates and FDI inflows. Whilst some studies have found tax rates to be significantly related to FDI inflows (Hartman, 1984; Slemrod, 1990), others have found limited evidence on the effect of tax incentives compared to factors such as labour costs, infrastructure and market size (Barlow and Wender, 1955; Aharoni, 1966; Root and Ahmed, 1978; Lim, 1983). On the other hand, most cross-country empirical studies indicate that tax rate factors have a significant impact on the regional distribution of FDI in a country (Forsyth, 1972; Moore et al., 1987; Hines, 1996).

The literature on taxation and FDI starts with Hartman (1984) as he was the first to point out the different tax relationships between FDI financed out of retained earnings and the transfer of funds. Hartman argued that retained earnings should be more sensitive to taxes because mature firms will want to use retained earnings to the largest extent as the marginal source of finance. This is because the costs of funding from retained earnings are lower than the transfer of new funds, therefore FDI through retained earnings should only respond to host country tax rates not parent country tax rates. Hartman (1984) measured the FDI inflows in the US as a ratio of GNP, and separately analysed FDI financed by retained earnings and the transfer of new funds based on his hypothesis. The result of this study is consistent with the hypothesis that only FDI from retained earnings responds significantly to host country tax rates. After Hartman's research, many subsequent papers have extended, modified or criticised Hartman's model such as Boskin and Gale (1987), Newlon (1987), Young (1988), and Murthy (1989). Jun (1989) also developed his research on the theory of Hartman (1984). However, different from other studies, he investigated the relationship between home country tax rates and direct investments aboard, and found that an increase in the home country tax rate will have a positive effect on direct investments abroad.

Slemrod (1990) criticised the earlier studies based on an alternative methodology. This paper extends and updates Hartman's model by replacing a measure of average tax rates with a measure of marginal effective tax rates. Slemrod argued that the tax systems of

both host country and home country should have effects on the incentives concerning FDI. In particular, he suggested that the tax sensitivity of investors from credit countries (Japan, UK and Italy) should be different from those from exemption countries (Germany, the Netherlands, Canada and France). To explore this hypothesis, Slemrod considered the bilateral investment flows from seven industrialized countries with the US to examine the systematic differences between the two types of investors.

Many subsequent studies during the 1990s have adopted Slemrod's model on bilateral FDI flows using aggregate time series (e.g. Grubert and Mutti, 1991; He and Guisinger, 1993; Hines and Rice, 1994). Meanwhile, other studies have focused on the effect of the changes in tax laws on corporate activities (e.g. Scholes and Wolfson, 1990; Swenson, 1994; Jun, 1994; Cassou, 1997). Hines (1996) further extended the previous research using data on individual countries' FDI into the US. This study takes into consideration the double tax relief and differences in international tax systems. Hines found that high state tax rates have a significantly negative effect on foreign investment decisions in the US and moreover, state taxes significantly influence the pattern of FDI.

5.3.2. Determinants of FDI in China

With the unique features of China's economy, the development of foreign investment in China has its own characteristics. Many scholars believe that FDI in China has developed as a result of the 'opening-up' policy, the economic reform, as well as the changes in the Chinese tax system.

Fung et al. (2002) traced the development of China's economic policy regarding FDI and the resulting changes in FDI inflows in the last twenty years. This paper also investigated the relationship between FDI inflows and the development of the Chinese economy. They found that the increase in FDI volume in China is a function of GNP changes, fixed-asset investments, foreign trade, economic transformation and the transfer of advanced technologies. Meanwhile, Huang (2003) reviewed the dual tax system in China, where foreign and domestic business activities are subject to different regulations and income tax laws. Huang showed that in many important aspects, the legislative and regulatory framework applied for FIEs appear to be superior to that for domestic enterprises, especially for domestic private firms. In addition, Ho (2004) and

Du, et al. (2008) examined the determinants of FDI for different sectors in China, which is the main concern for the next chapter.

Many previous empirical studies have provided evidence that China's tax incentive policies have positive effects on FDI. Tung and Cho (2000) tested whether tax rates influence foreign investment decisions and the particular forms of FDI in China. They showed that tax incentives are effective in attracting FDI to China, and moreover, influence the organisational form of FDI. Tung and Cho (2001) further investigated the issue by examining whether or not concessionary tax rates and tax incentives can attract FDI into certain designated areas in China. This study also controlled for other related non-tax variables such as infrastructure, unemployment rate and wage rate. The empirical results indicated that both tax and non-tax variables (infrastructure) are important determinants of regional investment decisions in China.

5.4. The Theory of FDI Allocation Decisions

The motivation of multinational enterprises (MNEs) to invest in foreign countries or regions are diverse. FDI theory states that the location decisions of MNEs are determined by "the relative location advantages of particular countries for certain activities[40]". In the mainstream academic literature, FDI may be divided into two categories: market-oriented FDI and resource-oriented FDI. For market-oriented FDI, which usually occurs in developed countries, the motivation for MNEs' overseas investments is the size of market and the potential market for development in the host country. Usually, the market size can be measured by the host area's total income or GDP: the larger the GDP the greater of the size of the potential market. Wheeler and Mody (1992) and Milner and Pentecost (1994) are two major examples concerning the market size of host countries. They believed that seeking new markets for products is the main reason for multinational corporations to invest overseas.

For resource-oriented FDI, the purpose of overseas investments is the low cost of certain resources, which fall into three categories: infrastructure, labour and natural resources. For this type of foreign investment, market size in the host country is less important in the sense that most products will return to the home country or be exported to other areas. Resource-orientated investments usually occur in emerging markets.

[40] Nachum and Wymbs (2002).

Existing studies on resource-oriented FDI usually use natural resource, wage rate or unemployment rate as the proxies of these resource factors (Hill and Munday, 1992; Friedman et al., 1992).

Of course, markets and resources are not the only factors that affect FDI inflows. Evidence suggests that many other factors, including policies and economic stabilisation in the host country, the law system, the business climate or environment and some other macroeconomic variables also play important roles in the allocation decision of investments (Moore et al., 1987; Hines, 1999). And with the development of 'free-trade areas', the differences between those two types of FDI become less distinctive.

On the other hand, tax rates are another key factor that could influence FDI location decisions. Some economists argue that although investment decisions of an enterprise are affected by a series of factors, they are eventually determined by marginal after-tax returns. For example, Jorgenson (1963, 1971) set up the 'basic capital cost theory' in their research to analyse the relationship between tax policies and investment activities. According to this theory, investment decisions are affected by corporate tax in two ways. Firstly, if taxes are imposed on the marginal earnings, it will result in the decrease of the marginal income of the investment which may restrain investment activities. On the other hand, if the government allows tax deductions, the costs of capital will decrease which may encourage the activities of investment. Therefore *ceteris paribus*, tax incentives should have positive effects on FDI. According to previous empirical studies on this field, most evidence shows that compared to factors such as labour costs, infrastructure and market size, tax incentives have limited effects on the initial foreign investment decisions (Barlow and Wender, 1955; Aharoni, 1966; Root and Ahmed, 1978; Lim, 1983) but significant impact on the decision of regional choice in a country or area after market entry (Forsyth, 1972; Hines, 1996).

This study mainly investigates the tax effects on FDI location choice whilst controlling for other non-tax factors that may influences investment decisions in China. Table 5.4 reports the non-tax variables used in this paper. First of all, according to the market-seeking theory, MNEs may be primarily interested in investing in areas with larger market or potential market for development because market demand directly affects the expected revenue of the investment. As stated above, the larger the market size of a

particular area is, *ceteris paribus*, the more attractive the area is to investors. This paper uses the total output of a city and the growth rate of output to capture the market demand effect.

Secondly, on the basis of resource-seeking theory, infrastructure should be another crucial factor that has significant effect on FDI inflows, including energy supplies, transportation capacities, expenditures on road and so on. Many previous empirical studies found a positive relationship between the infrastructure conditions and FDI inflows (Hill and Munday, 1991; Mudambi, 1995; Tung and Cho, 2001). In this study, annual water and electricity supply and per capita possession of road are regarded as proxies for infrastructure variables.

Labour resource is another important factor that could influence investment decisions especially for labour-intensive industries. MNEs usually have to consider the quality of the workforce they intend to employ in the host area which includes the availability, costs and education level of the local labour force. Obviously, the relationship between labour costs and FDI inflows tends to be a negative one. And the amount of the workforce in an area should have a positive effect on investment decisions. The empirical studies by Culem (1988) and Friedman et al (1992) showed evidence in support of those arguments. This study uses wage rate, total number of students in universities as proxies for labour costs and education levels of the labour force, respectively. In addition, population and unemployment rate data are collected to test the effect of labour availability in China.

Table 5.4

The possible non-tax determinants of FDI distribution

Control variables in this model	**data**
Infrastructure	1) Annual water supply (*Water*) 2) Annual electricity supply (*Electricity*) 3) road (*Road*)
Market size and potential market size	Output of city i (*Output*) and growth rate of output for city i (*Growth*)
Labour costs	Wage rate in region i (*Wage*)
Education	Total number of students in University in city i
Labour availability	Unemployment rate and population

Source: author's summary.

Furthermore, as a special situation in China, there are remarkable regional differences in geographic conditions and infrastructures. Cities in the eastern part of China are located near the sea or rivers which have obvious advantage in transportation compared to western areas which are mostly covered by mountains or grassland. The 'opening up' policy of the Chinese Government is executed from the east to the west, which leads to different degrees of openness and unbalanced economic development around China. Therefore, regional differences are taken into consideration in the analysis of FDI location choice and the effects of tax incentives and concessionary tax rates are compared in different parts of China as well.

5.5. Research Hypothesis and Model Specification

5.5.1. Hypotheses development

In order to encourage foreign investment, the Chinese Government has implemented a series of tax and policy benefits for foreign investors including reducing taxes, giving favourable policy treatments, enhancing political stability and improving infrastructure. This section sets out the main hypotheses under a general equilibrium theory.

Tax variable is the most common factor to be tested by previous studies in this filed. Many previous studies provide evidence that taxes significantly influence the performance of foreign direct investment (Hartman, 1984; Hines, 1996; Tung and Cho, 2001). China is a particularly representative case to test the tax effects on FDI regional distribution because of the double tax system and special tax incentive policies applied by the Chinese Government.

H1: *Cities with concessionary tax benefits and more favourable tax rates are expected to attract more FDI than other cities.*

There exist significant regional differences within China including geographic features, economic development, environment, infrastructure, etc. Therefore, it is necessary to consider the regional factors in the estimation of FDI determinants (Tung and Cho, 2001). Some previous studies have investigated the regional differences of FDI in the

UK and US (Jones and Wren, 2009) but few so far have been focused on the Chinese market.

H2: *Cities located in the eastern and inner parts of China would have more FDI inflows than those located in the western and inner parts of China.*

Infrastructure is another important variable that is believed to have an effect on FDI location decisions. Many previous studies have found significant correlations between measures of infrastructure and FDI inflows (Head and Ries, 1996; Coughlin et al., 1991; Kumar, 2001), although some other studies found no significant relationship (Bronzini, 2004; Shepotylo, 2006). In China, infrastructure development is highly unbalanced between eastern and western areas, and between major cities and smaller cities. Therefore, the strong correlation between infrastructure and region variables implies infrastructure is expected to have a positive effect on FDI inflows.

H3: *All else equal, cities with better infrastructure conditions will attract more FDI than cities with less developed infrastructure.*

In the mainstream academic literature, seeking market is one of the main purposes for MNEs to invest overseas. Therefore, market size or the growth rate of market should be a very important determinant for FDI. Many studies have been focused on the market effects on FDI location decisions, such as Milner and Pentecost (1994) and Billington (1999). Usually GDP or the growth rate of GDP is used as the proxy for market size or potential market size in host countries.

H4: *Cities with larger market size (output) are expected to attract more FDI than other cities.*

Labour cost (wage rate) is another common variable tested in FDI determinants estimation. The original resource-seeking theory of FDI has indicated that seeking low cost labour is an important incentive for MNEs to invest overseas. Low labour costs are believed to be one of the primary reasons for China's success in attracting such a high volume of FDI inflows (Hill and Munday, 1992; Friedman et al., 1992; Janicki and

Wunnava, 2004; Ali and Guo, 2005). Besides wage rates, labour costs can also be proxied by labour conditions, unemployment rates or labour regulations.

H5: *Cities with higher wage rates are expected to have lower levels of FDI inflows.*

5.5.2. Estimation methods

Most research on this field uses time series analysis. The dataset in this study combine time series and cross sections for analysis which provide rich sources of information to examine the determinants of FDI distributions across provinces and over time. The structure of the data indicates that in additional to pooled regressions (OLS), a better analytical methodology for this study is the panel data model. Panel data analysis is a method of studying a particular subject within multiple sites, periodically observed over a defined time frame. Panel analysis has enabled researchers to undertake longitudinal analyses in a wide variety of fields and endows regression analysis with both a spatial and a temporal dimension. The use of panel data also provides a means of controlling for the effects of missing or unobserved variables which OLS regression cannot do. The two specifications most commonly used are the fixed effects (FE) and random effects (RE) models based on the assumptions on the individual-specific effects and how they are treated. Here, Hausman[41] test (Hausman, 1978) is used to choose between fixed and random effect models. For this study, we use fixed effects model for the estimations as a result of the Hausman test. However, as robustness checks, this research also reports the OLS estimation results for comparison.

The fixed effect equations can be extended to include both group effect and time-specific effect:

$$Y_{it} = X'_{it}\,\beta + \alpha_i + \lambda_t + \varepsilon_{it} \qquad (5\text{-}1)$$

where Y_{it} is the amount of FDI in city i in year t; X'_{it} is a vector of explanatory variables; ε_{it} is the disturbance associated with individual i at time t; β is the vector of parameters to be estimated; α_i and λ_t are the coefficients on the individual-specific and time-specific dummy variables which allow for heterogeneous intercepts across individuals and time. In this study, we use the classical fixed-effects model in which the coefficients of the

[41] Hausman, J.A., 1978. Specification Tests in Econometrics, Econometrica, 46 (6), 1251–1271.

explanatory variables are fixed over time, namely, there is only one vector of β parameters in estimation.

The model of this paper is developed from Tung and Cho (2001). Tung and Cho (2001) made some modifications on the previous models to examine the tax incentives and regional investment choice in China. They showed that tax rates and tax incentives are important determinants of regional investment decisions in China, as well as the infrastructure variables. However, there are several caveats existed in their research. Firstly, the sample is not representative enough, which only covers 43 special tax incentives zones and cities. Secondly, Tung and Cho (2001) failed to consider the large regional discrepancies in China's economy and infrastructure, which means that concessionary tax benefits are supposed to have different effects in different parts of the country. Therefore, this research collects more comprehensive data for regression analysis (covering 300 major cities in China) and takes the regional differences factors into consideration. In addition, the analysis not only compares the differences between special incentive zones and other non special incentive cities but also within special tax incentives zones based on the different concessionary tax rates they are subject to.

Based on the above discussion, the following regression model is used in this study:

$$FDI_{it} = \alpha_0 + \beta_1 (33\% - T_{it}) + \beta_2 West + \sum_k \alpha_k control_{kit} + \varepsilon_{it} \quad (5\text{-}2)$$

where the subscript denotes region/city i in year t. T_{it} is the tax rate for city i in year t. *West* is set to be 1 for cities that are located in the western area and 0 otherwise. The control variables that may influence FDI include infrastructure, market size, market size growth, labour costs, education and labour availability. As shown in Table 5.4, infrastructure is proxied by annual water supply, annual electricity supply and per capital possession of road; market size is represented by the output of a city and the growth rate of output; wage rate is a proxy of labour costs and the total number of students in a city is the proxy of labour force education; labour availability is represented by the unemployment rate and population of a city. Note that the tax effects captured in this study are only a small part of tax incentive policies. As shown in Table 5.2, in addition to tax incentive policies for different regions/cities, different forms of FIEs have varying tax concessions. Further, tax rates and tax incentives are also different across sectors. Information revealed from China's national databases is not

sufficient to capture such complexities on tax incentives between sectors and different forms of FIEs. Here, the tax rates used are the weighted average tax rates for cities with tax incentive policies and the normal fixed tax rate of 33% for cities without tax incentives.

However, as discussed in the last chapter, an obvious disadvantage of the FE model is that it cannot include variables which are static over time, such as the region dummies. This is because the regional dummy (*West*) is inevitably collinear with the individual dummies (i.e. cities) used in the fixed-effect model. In order to circumvent this problem while examining the effect of specific areas in China on FDI, two alternative methods are used. First and obviously, the collinearity can be removed in a random-effect setting but this can only serve as a robustness check given the results of the Hausman tests in favour of fixed-effect models. Second, the regional dummy is 'interacted' with other variables in the fixed-effect models so as to compare the difference of each FDI determinant across eastern and western areas[42]. Both methods will be used in the empirical results section that follows.

According to the second method discussed above, a set of new variables (*Tax*West* and the product of *West* and other control variables) is added to the model to depict this interaction between tax incentive (and other) variables and the region dummy:

$$FDI_{it} = \partial_0 + \beta_1(33\% - T_{it}) + \beta_2 West + \beta_3(33\% - T_{it}) * West + \\ + \sum_k \partial_k control_{kit} + \sum_k \lambda_k control_{kit} * West + \varepsilon_{it} \quad (5\text{-}3)$$

where all variables are defined in the same ways as in Eq (5-2). β_3 is the coefficient of interest as it measures whether or not the effects of tax benefits are different between the western and other areas of China (given the definition of *West*, a positive β_3 indicates that the FDI sensitivity of tax benefits is larger in the western area than the rest of China). In addition, this study also tries to look at the changes of FDI inflows over time particularly after 1992 (new tax law), though the results are not report in regression analysis.

5.6. Data and Sample Descriptives

[42] In linear regressions, the inclusion of a dummy variable shows the difference between two groups of samples on the intercept, whilst the interaction term of a dummy variable and another variable shows the difference of slope coefficients (on the variable) between the two groups.

This section describes the data collection process and sample statistics for this study. The methodology of the regression analysis for this chapter is also discussed in this part.

5.6.1. Data and sample selection

This study examines the effects of tax rates and tax incentives on FDI location choice in China whilst controlling for other variables such as output, infrastructure, labour costs and so on. Consequently, the data used in this study includes the amount of FDI utilized, which is the dependent variable of the empirical analyses and various independent variables. They are obtained from 1) Urban Statistical Yearbook of China (National Bureau of Statistics, PRC, 1990-2007 editions); 2) China Economics Information and Statistics Database. The Urban Yearbooks provide two figures of FDI—'the amount of *agreed investment*' and 'the amount of *actually utilized*'. The latter one is used in this study to measure the actual amount of investments in each city. Concessionary tax rates and tax incentives in different regions are collected from the Yearbook of China's Special Economic Zones and Coastal Economic Technology Development Zones (National Bureau of Statistics, PRC, 1992).

The sample period of this study is from 1990 to 2007. Data from 300 cities, which covers most major cities in the east, middle and west part of China, are collected for this research. Only major cities in every province are selected to minimise the impact of unusual or extreme effects[43]. The sample consists of seven Special Investment Incentive Zones which include 143 cities, and 157 non-tax incentive cities. Those tax incentive zones and cities offered a concessionary a tax rate for FDI ranging from 15% to 24%.

On the other hand, this study divides all the cities into two categories by geographic locations, namely eastern and western areas[44]. In order to compare the tax incentive effects in different regions, data are collected in a manner that a balance could be kept between eastern and western cities. There are 107 cities located in the western provinces and the rest of cities belong to the eastern areas.

Table 5.5 shows the proportion of economic activity that represented by the sample cities. According to the 2008 data, the output of sample cities selected in this study

[43] Major city means cities at the level of Prefecture-level, County-level or Municipality cities.
[44] This classification is based on the China Economics Information Database.

accounted for 52% of China's total GDP. The proportion of total FDI inflows represented by the sample cities is 93%, of which 96% is from cities in the eastern areas. It can be seen that the sample cities could well represent the economic activities in China. Because the selection of sample cities is by definition non-random, there could be possible sample selection bias. This problem is to some extent addressed by removing outliers (i.e. the largest cities) from the analysis, or by the inclusion of control variables.

Table 5.5

The proportion of economic activity represented by sample cities

	GDP (RMB Bil)	FDI (USD Bil)	Population (Mil)
Sample cities	15,577	92.4	1,328.0
China	30,067	85.9	358.6
proportion	52%	93%	27%

Source: China Statistics Yearbook, 2008.

5.6.2. Descriptive statistics

Table 5.6 presents the descriptive statistics for the variables. This study did not eliminate the outlier observations, because that will drop some important cities such as Shanghai and Beijing. Removing missing values has resulted in a sample of 272 cities with 3,297 observations[45].

Tax differences is the differences between the income tax rates of special tax incentives zones and tax rates of non-tax incentive cities (ordinary income tax of 33%).

$$Tax\ difference = \Delta taxrate = 33\% - T_{it} \qquad (5\text{-}1)$$

where T_{it} means tax rate in city i year t. For cities located in special incentive zones or with special tax policies, the tax rates range from 14% to 25%; for other cities, the tax rate is 33%. *Output* and *wage rate* are denominated in RMB (the Chinese currency) and

[45] For most cities the infrastructure data is not available until 1991. Therefore, the infrastructure variables have a slightly smaller sample size with 3,072 observations in 371 cities. Including only these 3,072 samples in the empirical analyses does not alter the regression results significantly, but will reduce the sample size in some cases. Results that only include these samples are available from the author upon request.

the *FDI* in US dollars[46]. The mean value of *tax difference* is 6.9% ranging from 0 to 18%. For cities without tax incentive policies, the tax difference is 0 by definition and for tax incentive zones the tax difference is greater than 0. It can be seen that the FDI of a city varies from 0 to USD7919 million, which is a considerably large range. The same situation is seen in *output* (ranging from RMB471 million to RMB1206, 606 billion) and infrastructure variables[47] as well. Those figures imply that the development of economy and the establishment of infrastructures are seriously unbalanced in China.

Note that there are some 'abnormal' observations or potential outliers for some variables. This could either happen due to the lack of standard variable definition or censoring method (e.g. 0% unemployment means no officially registered unemployment), or poor data quality. Most of these observations are found in the early years of the sample period, when the data is highly incomplete and the national statistics system is significantly under-developed. Removing these observations or winsorising these variables thus has a negligible effect on the overall empirical results.

Table 5.6

Descriptive statistics

Variable	Mean	S.D.	Min	Max	N =	Cities
FDI (USD Mil)	186.01	568.55	0.00	7,919.54	3,297	272
Tax difference	6.90	6.39	0.00	18.00	3,297	272
West	0.21	0.41	0.00	1.00	3,297	272
Output (RMB Mil)	26,966.79	65,228.59	471.00	1,206,606.00	3,297	272
Growth (%)	18.98	23.56	-100.00	593.26	3,297	272
Population ('000)	1,206.39	1,432.51	143.50	15,260.20	3,297	272
Unemployment (%)	1.56	1.72	0.00	31.25	3,297	272
Wage (RMB '000)	11.35	6.77	0.68	49.44	3,297	272
Water (Mil ton)	182.22	330.99	1.62	9,448.50	3,072	271
Electricity (Mil kwt-hr)	3,835.88	6,987.68	0.00	107,238.00	3,072	271
Road (Mil km)	6.47	8.75	0.00	419.10	3,072	271
Education ('000)	113.11	151.17	0.72	1,238.66	3,072	271

Table 5.7 reports the estimated correlations for all the variables. The correlation coefficients review the 'direction' of the sensitivities of each variable on FDI. Correlations analysis allows a useful but limited view of the data (the coefficients fail to

[46] To check the potential effect of exchange rates on FDI volume, the FDI data has been converted into the local currency (RMB) using the prevailing exchange rates at year end. However this does not have any significant effect on the overall results.
[47] The unit of each variables are displayed in table 5.5.

control for the effects of other variables, nor do they address the magnitude of the sensitivities of independent variables). It is shown that in most cases the relationship between variables is as expected. Specifically, tax rate difference is positively correlated with FDI and western areas appear to have received a lower amount of FDI than eastern areas.

Table 5.7

Pair-wise correlation coefficients between variables

	FDI	*Tax*	*Reg.*	*Output*	*growth*	*Pop.*	*Unemp.*	*wage*	*Passen.*	*Elec.*	*Road*	*edu*
FDI	1.00											
Tax diff.	0.42	1.00										
Region	-0.13	-0.21	1.00									
Output	0.86	0.42	-0.10	1.00								
Growth	0.07	0.07	-0.03	0.09	1.00							
Population	0.67	0.42	-0.05	0.81	0.07	1.00						
Unemp.	-0.01	0.00	-0.07	-0.02	-0.08	-0.04	1.00					
Wage	0.43	0.24	-0.02	0.52	0.17	0.25	-0.13	1.00				
Water	0.59	0.35	-0.10	0.65	0.03	0.65	0.04	0.19	0.27			
Electricity	0.82	0.41	-0.11	0.93	0.06	0.81	0.00	0.44	0.42	1.00		
Road	0.78	0.42	-0.11	0.91	0.08	0.78	-0.03	0.47	0.44	0.88	1.00	
Education	0.68	0.44	-0.06	0.83	0.07	0.93	-0.05	0.37	0.50	0.79	0.79	1.00

Given the large correlation between some of the variables (e.g. *Electricity* and *Output*), it is possible that two or more variables may be multicollinear. Multicollinearity refers to a situation in which two or more explanatory variables in a multiple regression model are highly linearly related. In case of perfect multicollinearity (exact linear relationship) one or more variables have to be dropped to calculate the variance-covariance matrix. In other cases, the coefficient estimates of some variables tend to be less precise. An easy way to detect multicollinearity is to add or remove explanatory variables in the regression and check if there are substantial changes in coefficient estimates or estimated coefficient standard errors. This practice is undertaken in the following multiple regression analyses and by comparing coefficient estimates from different specifications, no clear sign of multicollinearity is found. Also it should be noted that although multicollinearity may 'mask' the true relationship between dependent and independent variables, it does not bias the results nor affect the fitness of the model.

5.7. Empirical Results

Tables 5.8 to 5.10 present the results of the regression analyses. As a robustness check, this paper reports the regression results for the full sample as well as the results for the using observations that exclude Beijing, Shanghai, Guangzhou and Shenzhen. The reason for removing those four cities is that they were open to foreign investors relatively earlier and have superior political or economic conditions than other cities, which means they have been playing a very important role in attracting FDI inflows but also are the natural candidates for outliers. Those four cities have established economies of scale and good business environments for foreign investors and as a result, they tend to be more attractive to foreign investors even without tax incentives. Therefore, in order to capture tax incentives for FDI it is necessary to re-test the model by removing those four cities (Sun et al., 2002).

Table 5.8 shows the pooled regression results. Specifications 1 to 3 report the results using the full sample of cities and Specifications 4 to 6 report the results for the sample excluding Beijing, Shanghai, Guangzhou and Shenzhen. For all specifications tax incentive variables and region variables are statistically significant at 1%. This is consistent with the prediction by H1 that cities with larger concessionary tax benefits attract more foreign investment.

FDI is significantly related to some non-tax factors, as well. Market size (*output*) is significantly and positively associated with FDI inflows which indicate market size is another important factor that determines FDI location decisions (H4). However, the growth rate of output does not have any significant effect. For all specifications in table 5.8, wage rate (*wage*) has a negative and statistically significant effect on FDI inflows which is consistent with hypothesis H5. For the whole sample models, both water and electricity supplies are positively related to FDI. This implies that infrastructures on natural resources (e.g. water) and energy (e.g. electricity) are more important considerations than utilities (e.g. road) when FIEs make investment decisions. Interestingly, education is negatively related to FDI inflows, which may owe to the fact that most of the foreign investment in China are within labour-intensive industries that have lower needs for highly educated employees. This could also be a result of the strongly imbalanced distribution of educated workforce in China and city-specific needs for more educated labours, which means the effect of education has to be considered in the context of individual cities using panel data models.

There are some interesting findings when excluding the four largest FDI recipient cities (Beijing, Shanghai, Guangzhou and Shenzhen), although our main findings on tax, region, infrastructure, market size and wage variables still hold (Specifications 4 to 6). The negative coefficient estimate on *population* may reflect the high concentration of investments in labour-intensive industries in the four cities that are removed from the analysis, especially Guangzhou and Shenzhen. Labour force availability may have become a less important consideration when investing in cities other than those four. Electricity supply becomes negatively related to FDI probably because the majority of electricity generated will be transmitted to larger cities where foreign investment is concentrating. Therefore, electricity may not be a precise measure of the energy supply in that specific city especially when the city is not a major city.

Table 5.9 represents the results using panel data models. Again we first report the results for the full sample (Spec 1 to 4) and then for a sample without the four major FDI recipient cities (Spec 5 to 8). The coefficient estimates of tax incentives and output are positive and significant, which confirms the results from the pooled regressions. The growth rate of output (*growth*) variables do not have any explanatory power in panel data analysis using the full sample of 300 cities, however, the coefficient estimates for *growth* when excluding the four major cities are highly significant and positively related to FDI at 95% confidence level which indicates that the growth potential of a city is a key consideration when foreign investors decide to invest in a 'second tier' city other than the primary cities of FDI.

Table 5.8

Pooled regressions: Determinants of FDI

This table shows the OLS regression results for Equations (2) and (3). Specifications 1 to 3 report the results using the full sample and Specification 4 to 6 report the results excluding Beijing, Shanghai, Guangzhou and Shenzhen. Specification 3 and 6 report further analyses on the interaction effects between regions and FDI determinant variables. *Tax diff.* = 33%-T_{it} and *West* = 1 for cities located in the western provinces and 0 otherwise. *, **, ***stand for 10%, 5% and 1% significant levels, respectively.

Variables	Spec (1)	Spec (2)	Spec (3)	Spec (4)	Spec (5)	Spec (6)
Tax diff.	8.187***	7.947***	10.406***	6.366***	6.639***	8.136***
	(0.858)	(0.912)	(0.964)	(0.696)	(0.743)	(0.779)
West	-50.136***	-44.943***		-36.384***	-37.013***	
	(12.098)	(12.878)		(9.399)	(10.116)	
Output	0.007***	0.006***	0.005***	0.009***	0.011***	0.011***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Growth	0.258	0.236	0.179	0.237	0.298*	0.283*
	(0.204)	(0.214)	(0.221)	(0.159)	(0.169)	(0.172)
Population	0.017***	0.030***	0.018*	-0.050***	0.006	0.009
	(0.005)	(0.010)	(0.011)	(0.005)	(0.009)	(0.009)
Unemploy	2.478	-0.131	1.644	-1.119	-1.166	0.073
	(2.845)	(3.248)	(3.478)	(2.213)	(2.554)	(2.709)
Wage	-3.251***	-1.723*	-2.001*	-6.037***	-5.119***	-5.167***
	(0.875)	(0.981)	(1.022)	(0.752)	(0.820)	(0.842)
Water		0.151***	0.146***		0.042**	0.058***
		(0.023)	(0.022)		(0.019)	(0.019)
Electricity		0.013***	0.016***		-0.012***	-0.017***
		(0.002)	(0.002)		(0.002)	(0.002)
Road		1.011*	0.947		0.580	0.670
		(0.607)	(0.600)		(0.480)	(0.470)
Education		-0.405***	-0.231**		-0.663***	-0.633***
		(0.095)	(0.103)		(0.083)	(0.090)
*Tax * West*			-9.807***			-8.263***
			(2.910)			(2.269)
*Output * West*			-0.003***			-0.008***
			(0.001)			(0.001)
*Growth * West*			0.639			0.198
			(0.689)			(0.536)
*Population * West*			0.020			-0.016
			(0.031)			(0.025)
*Unemploy * West*			4.074			1.409
			(8.084)			(6.282)
*Wage * West*			2.441			2.106
			(2.387)			(1.860)
*Water * West*			-0.252*			-0.164
			(0.150)			(0.117)
*Electricity * West*			-0.018***			0.016***
			(0.006)			(0.005)
*Road * West*			6.278			3.199
			(4.937)			(3.838)
*Education * West*			0.298			0.809***
			(0.292)			(0.231)
Constant	-43.886***	-74.880***	-95.104***	28.088**	12.035	-5.501
	(14.554)	(16.082)	(15.868)	(12.111)	(13.290)	(12.976)
Sample size	3297	3072	3072	3240	3020	3020
Adjusted R^2	0.767	0.777	0.785	0.660	0.668	0.686

The coefficient estimates for labour market variables (*Population* and *Unemploy*) are different from the OLS results. Here unemployment numbers are significantly positively related to FDI inflows, implying that unemployment is a better proxy for labour availability. Wage rate (*wage*) remains significantly and negatively related to FDI especially when making investment decisions in cities other than the four major ones. As the largest recipients of FDI, the four super cities may be the main driving force for the results found so far. This means that compared to other cities, high wage rates may not be a main barrier for investments in these four cities owing to their good investment environment and high degree of economic development. Electricity supply is still an important consideration of FDI especially when including the four large cities in the analysis. Importantly, the panel model estimation results show that *Education* is significantly and positively correlated with the amount of FDI when taking city-specific effects into account in the empirical analysis.

Examining the regional differences in FDI decision making is another key objective of this study. An obvious approach is to include a region dummy variable (*West*) in the regression models. As revealed in Table 5.8 in OLS regressions, cities located in the western areas receive significantly lower amounts of FDI. Here the average difference between western and other cities is around USD 40 million in terms of actual-utilised FDI. Because of the collinearity between the region dummy and individual effects, the only way to use the region dummy in a panel data setting is a RE model. Specifications 3 and 7 of Table 5.9 show similar findings with the OLS models.

Given the dramatic change in tax policies in 1992, it would be interesting to investigate the location choice of FDI before and after 1992. A natural strategy would be to include a dummy variable for samples pre- and post-1992 in the regressions. By adding a year dummy (1 if year > 1992 and 0 otherwise) in specification 1 of Table 5.9, the coefficient estimate for the dummy is positive and significant at 1% level, meaning FDI has increased significantly after the introduction of major tax incentive policies in 1992[48]. However the result should be interpreted with caution. First, the pre-1992 sample size is only 137 out of 3,297, giving rise to a big coefficient estimate with a large standard error. Second, the time effect should have already been captured by the inclusion of year-specific effect in each of the FE panel data specifications.

[48] The coefficient estimate is 52.69 with a standard error of 22.64.

Table 5.9

Panel data regressions: Determinants of FDI

Table 5.9 shows the panel data regression results for Equations (2) and (3). Specifications 1 to 4 report the results using the full sample and Specification 5 to 8 report the results excluding Beijing, Shanghai, Guangzhou and Shenzhen. In addition, specification (3) and (4) represent random effects regression result as the robust check while the rest of other specifications report fixed effects results according to Hausman test. χ^2 reports the Hausman test statistic by comparing the coefficient estimates for FE and RE models, respectively. *Tax diff.* = 33%-T_{it} and *West* = 1 for cities located in the western provinces and 0 otherwise. *, **, ***stand for 10%, 5% and 1% significant levels, respectively.

	Spec (1)	**Spec (2)**	**Spec (3)**	**Spec (4)**	**Spec (5)**	**Spec (6)**	**Spec (7)**	**Spec (8)**
Variables	Fixed effect	Fixed effect	Random effect	Fixed effect	Fixed effect	Fixed effect	Random effect	Fixed effect
Tax diff.	14.828***	8.645***	9.587***	11.409***	8.784***	7.332***	8.722***	9.390***
	(4.168)	(2.986)	(1.445)	(3.331)	(2.685)	(2.261)	(1.974)	(2.523)
West			-37.458*				-27.722**	
			(21.154)				(13.480)	
Output	0.005***	0.003***	0.004***	0.003***	0.008***	0.008***	0.009***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)
Growth	0.238**	0.160	0.113	0.152	0.208**	0.264**	0.244**	0.263**
	(0.103)	(0.162)	(0.170)	(0.169)	(0.102)	(0.122)	(0.115)	(0.127)
Population	-0.023	-0.100***	-0.023**	-0.112***	-0.089***	-0.089***	-0.054**	-0.093***
	(0.029)	(0.014)	(0.011)	(0.014)	(0.028)	(0.011)	(0.025)	(0.011)
Unemploy	5.000***	6.913**	5.390*	7.303**	2.281*	3.430*	2.903*	3.707
	(1.832)	(2.751)	(2.821)	(3.038)	(1.252)	(2.069)	(1.603)	(2.281)
Wage	1.599	-1.100	-2.171***	-0.149	-3.180**	-3.231***	-3.911**	-2.474***
	(1.206)	(0.840)	(0.840)	(0.900)	(1.514)	(0.671)	(1.536)	(0.719)
Water		-0.006	0.078***	-0.007		-0.002	0.016	0.006
		(0.023)	(0.022)	(0.023)		(0.017)	(0.019)	(0.017)
Electricity		0.023***	0.023***	0.025***		-0.008***	-0.008	-0.012***
		(0.003)	(0.003)	(0.003)		(0.002)	(0.009)	(0.003)
Road		0.262	0.443	0.183		0.304	0.354	0.293
		(0.489)	(0.507)	(0.488)		(0.370)	(0.520)	(0.368)
Education		0.724***	0.380***	0.875***		0.068	-0.055	0.185**
		(0.098)	(0.094)	(0.106)		(0.083)	(0.266)	(0.092)
*Tax * West*				-12.900*				-10.880**
				(7.355)				(5.520)
*Output * West*				0.003*				-0.003***
				(0.001)				(0.001)
*Growth * West*				0.167				0.056
				(0.554)				(0.415)
*Population * West*				0.048				0.028
				(0.065)				(0.049)
*Unemploy * West*				-7.696				-4.100
				(7.028)				(5.265)
*Wage * West*				-6.239**				-3.914*
				(3.010)				(2.268)
*Water * West*				-0.068				-0.081
				(0.219)				(0.164)
*Electricity * West*				-0.022***				0.015**
				(0.009)				(0.007)
*Road * West*				3.519				3.409
				(6.565)				(4.915)
*Education * West*				-0.810**				-0.120
				(0.336)				(0.256)
Constant	-57.937	-3.683	-65.050***	-3.263	36.555	48.898***	22.797	41.222**
	(46.579)	(24.373)	(18.300)	(26.756)	(32.277)	(18.215)	(25.489)	(19.963)
Sample size	3297	3072	3072	3072	3240	3020	3020	3020
No. Cities	272	271	271	271	268	267	267	267
χ^2	100.19***	236.10***	–	245.96***	40.25***	85.43***	–	111.16***
R^2	0.745	0.745	0.767	0.738	0.639	0.638	0.658	0.648

Another way to investigate regional differences in China's FDI inflows is to 'interact' the location of a city with the key determinants of FDI identified in the previous analyses (Eq 5-3). For OLS regressions, the results for Eq (5-3) are reported in Specifications 3 and 6 of Table 5.8 and for panel data regressions, the results are reported in Specifications 4 and 8 of Table 5.9.

Both OLS estimates and panel data regression results in table 5.8 and 5.9 show strong evidence on the different effect of tax incentives on FDI in different parts of China. It is shown that the coefficient estimates for *tax*West* are negative and highly significant. Since *West* are set to be 1 for cities that are located in the west of China and 0 otherwise, the negative coefficient means that tax incentives have larger effects on FDI inflows in the eastern than the western part of China as we predicted. That could be the results of several reasons, for example, the complex geography situations in the western cities, undeveloped economy or the relatively scarce labour resources but ample natural resources, all of which could hamper foreign investors' decisions to invest in these areas. For other interaction terms, coefficient estimates on *output*West* and *electricity*West* are statistically significant and negative, as well. However, the coefficient estimate of *electricity*West* becomes positive for the estimation using samples without the four major FDI recipient cities (Spec. 8) which indicates that electricity supply is a very critical factor for FDI location choice and it may have greater effects in western area than eastern area for normal cities.

As a robustness check, the persistence of the dependent variable (FDI) is considered. This involves using a dynamic panel data framework of the Blundell and Bond (1998) model, which includes lags of dependent and independent variables in the estimation. All right-hand side variables are the same as in static models but are lagged in their first orders to reduce possible endogeneity. Table 5.10 shows the regression results for robust one-step GMM-system estimations (Blundell and Bond, 1998). Note that in all specifications there is strong evidence of significantly negative first-order serial correlation in differenced residuals (AR(1)) and no evidence of second-order serial correlation in the first-differenced residuals (AR(2)), which is a key requirement for the GMM estimators to be valid. For all specifications, the Sargan test of over-identifying restrictions are rejected but this could be associated with the findings by Blundell et al (2000) that the Sargan tends to over-reject when the GMM method is used. It can be

seen that most of the findings from static panel data models still hold except for infrastructure variables. This is possibly a result of the low correlation between beginning-of-year infrastructure and year-end FDI volumes. As it is a common practice to use fixed-effects in dynamic panel data models, it is impossible to include the region dummy variable (*West*) in the regressions. However, when tax incentive variable is interacted with the region dummy, it still shows that tax is a less important consideration in FDI location choice in the western areas.

To summarise, tax incentives, region and output factors are very crucial variables that affect the FDI allocation decisions in China using both OLS estimates and panel data analyses. As expected, tax difference and output variables are positively related to FDI while region dummy variables are negatively related to FDI inflows. Moreover, wage rate is another important factor that may influence FDI location decisions in the way that high wage rates will stop foreign investors from making investment in a city. For infrastructure factors, the supply of electricity is found to have the largest impact on FDI. It is evident that removing four possible 'outlier' cities does not change the main results to a large extent.

5.8. Conclusions

This study investigates the impact of tax incentive policies on the regional distribution of FDI in China whilst controlling for other variables including infrastructure, market size, labour costs and regional differences. Using a sample consisting of 300 cities from all 34 provinces in China for the periods of 1990-2007, this study finds that that tax incentives and region factors are very crucial variables that affect the FDI allocation decisions in China. As expected, tax difference variables are positively related to FDI while cities located in the eastern and middle parts of China have attracted more FDI inflows than those located in the western part of China. In addition, wage rate, market size and infrastructure development especially electricity supply are found to play important roles in the FDI location choice in China. These findings are consistent with both market-oriented and resource-oriented theories of FDI location choice. Finally, the empirical evidence suggests that tax incentives and market size have greater effects on FDI inflows in the eastern than the western part of China.

Table 5.10

Dynamic panel data regressions: Determinants of FDI

Table 5.10 shows the the regression results for robust one-step GMM-system estimation (Blundell and Bond, 1998) in a dynamic panel data setting. Specifications 1 to 3 report the results using the full sample and Specification 4 to 6 report the results excluding Beijing, Shanghai, Guangzhou and Shenzhen. Sargan is a 2 test of overidentifying restrictions. Second and Service are dummy variables set to be 1 if a sector belongs to second and third/tertiary industries, respectively, and 0 otherwise. A constant term is included in each specification. Asymptotic robust stand errors are reported in parenthesis. *, **, ***stand for 10%, 5% and 1% significant levels respectively.

Variables	Spec (1)	Spec (2)	Spec (3)	Spec (4)	Spec (5)	Spec (6)
Tax diff.$_{t-1}$	0.505***	0.592***	0.509***	0.491***	0.552***	0.560***
	(0.071)	(0.083)	(0.081)	(0.132)	(0.134)	(0.131)
Output $_{t-1}$	15.237**	9.667**	12.012***	6.164*	8.693***	8.568**
	(6.660)	(4.402)	(4.507)	(3.698)	(3.307)	(3.417)
Growth $_{t-1}$	0.003***	0.004***	0.004***	0.006***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Population $_{t-1}$	0.194	0.208	0.226	0.321	0.342	0.334
	(0.215)	(0.246)	(0.278)	(0.197)	(0.216)	(0.227)
Unemploy $_{t-1}$	0.065**	0.069	0.045	-0.012	0.007	0.017
	(0.029)	(0.049)	(0.050)	(0.026)	(0.028)	(0.030)
Wage $_{t-1}$	5.846*	6.290*	5.128*	2.829*	4.095**	2.906
	(3.178)	(3.230)	(3.084)	(1.597)	(2.088)	(1.951)
Water $_{t-1}$		0.065	0.116		0.001	0.008
		(0.089)	(0.124)		(0.011)	(0.012)
Electricity $_{t-1}$		-0.009	-0.020		-0.011	-0.017*
		(0.012)	(0.020)		(0.008)	(0.009)
Road $_{t-1}$		0.206	1.053		-0.033	-0.008
		(0.277)	(1.183)		(0.122)	(0.119)
Education $_{t-1}$		-0.407	0.572		-0.442*	-0.474*
		(0.252)	(0.598)		(0.255)	(0.271)
*Tax * West* $_{t-1}$			-12.603***			-9.929**
			(4.451)			(3.949)
*Output * West* $_{t-1}$			-0.004**			-0.005***
			(0.002)			(0.002)
*Growth * West* $_{t-1}$			0.250			-0.154
			(0.288)			(0.215)
*Population * West* $_{t-1}$			0.020			-0.015
			(0.050)			(0.026)
*Unemploy * West* $_{t-1}$			3.959			3.715
			(4.013)			(3.324)
*Wage * West* $_{t-1}$			1.747			0.182
			(2.814)			(1.878)
*Water * West* $_{t-1}$			-0.146			-0.002
			(0.149)			(0.069)
*Electricity * West* $_{t-1}$			0.019			0.017*
			(0.019)			(0.009)
*Road * West* $_{t-1}$			12.603***			6.188*
			(4.779)			(3.566)
*Education * West* $_{t-1}$			-0.481			0.569**
			(0.609)			(0.253)
AR(1) (*p-value*)	0.004	0.002	0.002	0.002	0.004	0.005
AR(2) (*p-value*)	0.296	0.280	0.277	0.255	0.287	0.292
Sargan (*p-value*)	0.000	0.000	0.000	0.000	0.000	0.000
number of obs.	260	260	260	256	256	256
number of groups	2939	2939	2939	2886	2886	2886

Generally speaking, there is inconclusive empirical evidence for FDI location choice from the previous literature as samples, data periods, variables and methodologies may differ in each study. The main findings in this study are generally consistent with most of the previous studies for the Chinese market (Tung and Cho, 2001; Lan and Yin, 2009) and confirms the critical roles of tax, market size and infrastructure when foreign investors make investment decisions. More importantly, this study finds new evidence on the impact of regional factors in the FDI location choice in China. However, this study does not consider the new tax policy implemented in 2008, which has imposed a unified tax rate for both foreign invested and domestic enterprises. Future studies on the impact of these new policies on FDI inflows and location decisions in China are warranted when relevant data become available.

CHAPTER 6

Determinants of FDI in China: A Sector Level Analysis

6.1. Introduction

FDI has played a major role in China's economy and social life. The patterns and distributions of FDI have long been a major concern of researchers and policy makers alike. FDI has become an important means by which developing countries are economically linked to industrialised countries, and also to other developing countries. With increasing FDI inflows to China, China's industrial structure has changed dramatically in the recent twenty years. Similar to the regional distribution of FDI in China analysed in last chapter, the distribution of FDI across the country's industrial sectors will be investigated in this chapter. China has successfully attracted a huge amount of FDI since the announcement of the 'opening-up' policy in 1978. However, those foreign investments did not flow into every sector equally and their distribution is unbalanced particularly at the start of the 'opening-up' era. Like many developing countries, FDI in China is mainly concentrated in the secondary industry especially some labour-intensive sectors such as manufacturing. Since the early 1980s, the manufacturing sector has been the single largest recipient of foreign investment. The manufacturing sector accounted for about 80% of total FDI inflows in 1991 but the proportion has gradually declined since then. Although the sectoral distribution of FDI has changed a lot and foreign investment have extended to other fields of the economy in recent years, manufacturing still has a dominant position which accounted for about 54% of total FDI in 2008[49].

Sector choice is an important consideration in FDI decision-making and the sectoral distribution of FDI also has directly effect on the industry structure of the host country. However, there are only limited sectoral analyses of FDI in host countries from previous literature owing to the unavailability of relevant sector level data. This chapter contributes to the existing literature by undertaking an empirical investigation on the determinants of FDI sector distributions in China using a dataset of FDI in 14 major sectors for the period of 1990 – 2008.

[49] Data from the Statistic Yearbook of China.

The aim of this research is to empirically investigate the determinants for FDI sector investment choice in the Chinese market using sector-level data. Specifically, this chapter has two research objectives. First, discuss the characteristics of sector distributions of FDI inflows in China and its future trends and second, empirically examine whether those factors that are generally important for aggregate FDI still have significant effects on FDI sector choice decisions in China.

This chapter proceeds as follows. Section 6.2 provides a brief review of previous studies on FDI sector distributions. Section 6.3 presents hypotheses and model specifications. Section 6.4 briefly discusses the patterns of FDI sector distribution in China. Section 6.5 describes the data and summary statistics. Section 6.6 reports the empirical results and section 6.7 concludes this chapter.

6.2. Literature Review

Although there are only limited previous empirical studies on sector-level FDI distributions, sector choice in the host country is not a new topic in theoretical literature. In general, there are four dominant theories. The centre of these theories is the comparative-advantage theory proposed by Kojima (Kojima, 1973, 1975 and 1977). This theory argues that investors should choose sectors or industries which have comparative advantages in host countries (but relative disadvantages in the home country) to invest and focus their investments on the tertiary industry of the home country. It is believed that this selection of investment projects will help to optimise the industry structure in the home country. Kojima's theory is different from the mainstream theory in the US at that time but appears to be more suitable for Japan's situation as Japan's increasing FDI outflows from the 1970s completely reflect the validity of this theory.

The second theory is the product life cycle theory by Vernon (1966) where he argued that the decision to invest overseas is the result of the international product life cycle, which consists of four stages. Stage one is the introduction stage, when new production activities begin and a company in a developed country wants to exploit a technological breakthrough by launching a new, innovative product in its home market. Such market is more likely to start in a more developed nation because more high-income consumers

are able to buy and are willing to experiment with the new, expensive products (i.e. low price elastic). Thus new products are first exported to similar developed countries, and then to the most advanced developing countries. The second stage is the growth stage, when a similar (or duplicated) product is produced elsewhere and introduced in the home country to capture the growth in the home market. This moves the production activities to other countries, usually on the basis of cost of production. Stage three is the maturity stage. In this stage, the product's design and production process become increasingly stable. FDI in production plants drive down the unit cost and the lowest-cost producer wins the market. Production still requires highly-skilled, highly-paid employees, but export orders will begin to come from countries with lower incomes. The last stage is the declining or standardised products stage. During this period, the principal markets become saturated and the firm begins to focus on the reduction of process cost rather than the addition of new product features. As a result, less developed countries constitute the only markets for the product and the local market will have to import relatively capital intensive products from developed countries. Although product life cycle theory is not directly linked to the industry choice of FDI, in effect, it is indirectly related to the principle of industry choice for multi-national enterprises' (MNEs) foreign investment in the sense that MNEs should choose the industries in the foreign market to invest according to the stages of the firm's product life cycle.

The third theory is the small-scale manufacturing theory by Wells (Wells, 1976 and 1983). Contrary to the traditional view that the modern industry's scale economy is a comparative advantage of MNEs in developed countries, Wells is the first to argue that small-scale production can be an advantage for developing countries to invest abroad because of the low cost, and the similar culture and approach to the market. His argument stems from the fact that economy of scale may not be able to profit from low-income countries, which are characterised by limited demand for outputs. On the other hand, companies in developing countries are more likely to gain competitive advantages using small-scale manufacturing technologies, which make FDI by developing countries possible. Moreover, as Wells suggested, multinationals in developing countries are more competitive than their peers in developed countries in providing 'local procurement' and 'specialised products' as a result of technical innovation in the host country. Again this is contrary to the view that innovation usually happens in home countries. All the above features are enhanced by the ability of small-scale manufacture

to produce output at low costs and to avoid the effects of quotas on exports from their country of original. However, Wells did not provide sufficient empirical support to his theory.

The last theory also concerns the emergence of FDI by developing countries. Cantwell and Tolentino (1990) suggested that multinationals in developing countries have grown rapidly through "localised learning and technical accumulation". However this technical accumulation or innovation process is highly related to a country's increasing investments abroad, therefore the industry and regional distribution of FDI from developing countries will change overtime (along with the upgrade of domestic industries).

Evidence from empirical studies on FDI sector choice is scarce, though. Alfaro and Charlton (2007) examined the effect of FDI on growth by employing a comprehensive, industry level dataset from OECD member countries during 1985 and 2000 for 19 sectors in 29 countries. In this paper they attempted to distinguish different 'qualities'[50] of FDI to re-examine the relationship between FDI and growth using industry-level data and test whether or not these determinants of aggregate FDI have different effects on sector-level investments. They found that the growth effect of FDI increases on both national and sector level when accounting for the quality of FDI. Vu and Noy (2009) undertook similar analysis for developed countries and examined the different sector effects. This paper uses an endogenous framework to estimate the impact of FDI on growth using sectoral data for a group of 6 OECD member countries. This is the first attempt to formally indentify the sector-specific impact of FDI on growth in developed countries. Their results suggest that FDI has a significant and positive effect on economic growth both directly or through its interaction with the labour market. In addition, they also showed that the effect of FDI is not equally distributed in different sectors as well as different countries. In some sectors, there is no evidence that FDI help to explain economic growth. Never the less, most of previous empirical sector analyses are similar in the way that they have been concentrated on the effect of FDI on economic activities, with limited attention paid to the determinants of foreign investment across sectors.

[50] 'Quality' means the effect of a unit of FDI on economic growth

In terms of sector analysis for developing countries, Mathiyazhagan (2005) examined the relationship between FDI inflows and host countries' economic activities at sectoral level using annual data from 1990 to 2000 in India. This study uses panel co-integration test for the empirical analysis and the result is consistent with the majority of previous studies that FDI inflows have helped to raise output, productivity and export for India's economy in some sectors. The results also suggest that the further opening-up of the economy especially for some export-oriented sectors is needed to achieve a higher growth of India's economy. Chakraborty and Nunnenkamp (2008) checked whether India's reforms in 1991 have any impact on the changes in the structures and types of FDI, and whether this effect differs between primary, secondary and tertiary sectors. They applied co-integration and causality analyses by using industry-specific FDI stock data from 1987 to 2000. Their analyses suggest that the effect of FDI on economic growth significantly differs among sectors. In particular, they found that booming FDI in the service sector fails to give rise to India's economic growth. Moreover, they showed that manufacture output growth seems to have been promoted not only by FDI in this sector but also by FDI inflows in service sector through spill-over across sectors.

The majority of studies on FDI in China are on regional or national level with few studies conducting a sector-level analysis[51]. Dees (1998) examined the determinants and effects of FDI in China using panel data of 11 countries for the period of 1983 to 1995. The variables considered in his paper include market size, labour costs, exchange rate and stock of patents. It is found that FDI inflows are significantly motivated by large market size, low labour costs and real exchange rate of China. Shan (2002) examined the interrelationships between FDI and economic variables including output, labour supply, labour costs, energy consumption, exports, exchange rates and income differences. He found that FDI and output growth both have statistically significant impact on each other. In addition, FDI is found to be influenced by regional income differences and sensitive to the changes of a number of economic variables. Sun et al. (2002) used a dataset of 30 provinces from 1986 to 1998 to test the determinants of FDI across provinces. They collect the province-level data on market size (GDP), labour costs, domestic investment, labour quality, and infrastructures. They showed that labour

[51] Most of previous studies about the determinants of the location of FDI have been reviewed in the last chapter (Chapter 5). This chapter only looks at studies on China's FDI other than location determinants.

quality and infrastructure are very important determinants of FDI inflows and the effect of provincial GDP and wage rates are quite different before and after 1991.

To summarise, owing to the difficulty of collecting sector-level data for host countries (particularly for developing countries), empirical studies on FDI sector choice is still premature and there is a large scope of further research in this field. This study tries to make up some gaps in the literature to examine the factors that are important for FDI distributions across different industry sectors in China.

6.3. Patterns of FDI Sectoral Distributions in China

While FDI inflows in China grow steadily since the 1980s and 1990s, the investment structure and sectoral distribution of FDI have also changed significantly from the start of the 'opening-up'. Those changes have far-reaching impacts on China's economy and industry structures. This section will introduce the patterns of FDI sectoral composition and their effects in China.

There are three major industries in China according to the National Bureau of Statistic's classification. The *primary*, or *agriculture*, industry includes farming, forestry, animal husbandry and fishery. The *second* industry, or *industry and construction*, consists of mining and quarrying, manufacturing, electricity, gas and water production and supply. The rest of the sectors are classified as the *tertiary* (*service*) industry, including two major categories— circulation and service. The Circulation industry includes transportation, storages, post and telecommunication, and wholesale & retail trade & catering services. The service industry comprises of finance and insurance; real estate management; social services; health care, sports and social welfare; education, culture and arts, radio, film and television; and scientific research and polytechnic services.

Table 6.1

Sector distribution of FDI in China

Panel A: Year-end actual-utilised FDI by sector

Sector		amount of FDI (Mil USD)						
		1991	1994	1995	2000	2003	2007	2008
National total		**4,366.00**	**33,767.00**	**37,521.00**	**40,714.81**	**53,504.67**	**74,767.89**	**92,395.44**
Primary Industry	Farming, Forestry, Animal Husbandry and Fishery	139.71	979.24	900.50	675.94	1,000.84	924.07	1,191.02
Second Industry	Mining and Quarrying	3,671.81	24,649.91	27,202.73	583.28	336.35	489.44	572.83
	Manufacturing				25,844.17	36,935.70	40,864.82	49,894.83
	Electric Power, Gas and Water Production and Supply				2,242.12	1,295.38	1,072.55	1,696.02
	Construction	69.86	979.24	1,163.15	905.42	611.76	434.24	1,092.56
Tertiary Industry	Geological Prospecting and Water Conservancy	0.00	0.00	0.00	4.81	17.77	272.83	340.27
	Transport, Storage, Post and Telecommunication	87.32	371.44	450.25	1,011.88	867.37	2,006.76	2,851.31
	Wholesale & Retail Trade and Catering Services	91.69	1,958.49	2,138.70	857.81	1,116.04	3,718.17	5,371.48
	Finance and Insurance	4.37	33.77	112.56	76.29	231.99	257.29	572.55
	Real Estate	240.13	4,018.27	4,802.69	4,657.51	5,235.60	17,088.73	18,589.95
	Social Services	0.00	0.00	0.00	2,185.44	3,160.95	4,741.51	5,628.76
	Health Care, Sports and Social Welfare	4.37	67.53	75.04	105.88	127.37	11.57	18.87
	Education, Culture and Arts, Radio, Film and Television	21.83	337.67	262.65	54.46	57.82	483.55	294.59
	Scientific Research and Polytechnic Services	17.46	202.60	187.61	57.03	258.71	916.68	1,505.55
	Other Sectors	17.46	168.84	225.13	1,452.77	2,251.02	1,485.68	2,774.85

Source: Statistic Yearbook of China, 1991-2008.

Table 6.1 (Continued)

Panel B: Share of FDI in national total amount by sector

	Sector	1991	1994	1995	2000	2003	2007	2008
Primary Industry	Farming, Forestry, Animal Husbandry and Fishery	3.2%	2.9%	2.4%	1.7%	1.9%	1.2%	1.3%
Second Industry	Mining and Quarrying	84.1%	73.0%	72.5%	1.4%	0.6%	0.7%	0.6%
	Manufacturing				63.5%	69.0%	54.7%	54.0%
	Electric Power, Gas and Water Production and Supply				5.5%	2.4%	1.4%	1.8%
	Construction	1.6%	2.9%	3.1%	2.2%	1.1%	0.6%	1.2%
Tertiary Industry	Geological Prospecting and Water Conservancy	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
	Transport, Storage, Post and Telecommunication	2.0%	1.1%	1.2%	2.5%	1.6%	2.7%	3.1%
	Wholesale & Retail Trade and Catering Services	2.1%	5.8%	5.7%	2.1%	2.1%	5.0%	5.8%
	Finance and Insurance	0.1%	0.1%	0.3%	0.2%	0.4%	0.3%	0.6%
	Real Estate	5.5%	11.9%	12.8%	11.4%	9.8%	22.9%	20.1%
	Social Services	0.0%	0.0%	0.0%	5.4%	5.9%	6.3%	6.1%
	Health Care, Sports and Social Welfare	0.1%	0.2%	0.2%	0.3%	0.2%	0.0%	0.0%
	Education, Culture and Arts, Radio, Film and Television	0.5%	1.0%	0.7%	0.1%	0.1%	0.6%	0.3%
	Scientific Research and Polytechnic Services	0.4%	0.6%	0.5%	0.1%	0.5%	1.2%	1.6%
	Other Sectors	0.4%	0.5%	0.6%	3.6%	4.2%	2.0%	3.0%

Source: statistic Yearbook of China, 1991-2008.

As mentioned previously, the sectoral distribution of FDI is quite unbalanced in China, with the majority of FDI inflows concentrating on the secondary industry, especially the manufacturing sector. Table 6.1 reports the sector composition of foreign-invested firms from 1991 to 2008. Note that there are some changes on sector classification around 1995, where manufacturing, mining & quarrying and electricity power, gas and water production & supply were all merged as one sector called 'industry' before 1996[52]. Some sectors such as geological prospecting & water conservancy and social services were seldom opened, if ever, to foreign investment before 1996, therefore investments in these sectors are assumed to be zero[53].

From Table 6.1, we can see that FDI is heavily biased towards the second industry and manufacturing is the single largest FDI recipient, occupying more than 50% of total investments for all sample years. Although the share of manufacturing sector has declined dramatically between 1991 and 2008 from 84% in 1991 to 54% in 2008, it is still the most important sector in attracting FDI. Generally speaking, there are four prominent features of manufacturing. Firstly, investments in process manufacturing[54] (process manufacturing is common in the food, beverage, chemical, pharmaceutical, consumer packaged goods, and biotechnology industries) are much larger than on raw materials[55] (latex, iron ore, logs, and crude oil are examples of raw materials). Secondly, there are significantly more investments on light industry[56] (e.g. clothing, furniture, consumer electronics and household items) than heavy industry[57] (e.g. construction of large buildings, chemical plants, and production of construction equipment such as cranes and bulldozers). Thirdly, FDI is rarely seen in resources-based industry[58] (e.g. mining and, forestry) or monopoly sectors[59]). Lastly, the proportion of labour-intensive

[52] In fact, there are only few foreign investments on the sector of Mining & Quarrying and Electric Power, Gas and Water Production & Supply before 1996. Even in China, most of the enterprises on those two sectors are state-owned. Therefore, the industry sector before 1996 could be seen as manufacturing.
[53] Those sectors are not listed on statistic year book of China before 1996.
[54] *Process manufacturing* is a sub-category of manufacturing. The simplest and easiest way to understand the definition of process manufacturing is to recognise that, once an output is produced by this process, it cannot be distilled back to its basic components.
[55] A *raw material* is something that is acted upon or used by or by human labour or industry, for use as the basis to create some product or structure.
[56] *Light industry* is usually less capital intensive than heavy industry, and is more consumer-oriented than business-oriented (i.e. most light industry products are produced for end users rather than as intermediates for use by other industries).
[57] *Heavy industry* products can be generalised as more capital intensive or as requiring greater or more advanced resources, facilities or management.
[58] A *resource based industry* is one based on primarily using the raw materials from nature.
[59] In China, there are 8 monopoly sectors including petrochemical, tobacco, telecommunications, electric power, military, railway, variation, and banking.

industry[60] (e.g. clothing, electron, textile, construction) is much larger than other general processing industries.

Another obvious characteristic of sector-level FDI is there has been rapid development in the tertiary industry during the recent ten years. However, sectors within the tertiary industry still differ significantly from each other. FDI is mainly concentrated in real estate, social services and wholesale & retail trade and catering services, with investments in other sectors such as finance and insurance, health care, sports and social welfare relatively low. Real estate has been the largest FDI recipient in the tertiary industry and its share in total FDI increases greatly since the 1990s, from 5.5% in 1991 to 12.8% in 1995. Although this figure decreased for the next few years up till 2000, it regained its momentum and continued to rise again after 2000 and reached the peak in 2007, accounting for about one fourth of total FDI in China. Wholesale & retail trade and catering services is another sector that increases steadily for the recent 10 years especially after China's entering into the WTO, after when the Chinese Government has gradually opened the sector to overseas investors. Eventually it increased to 5.8% in terms of total investment in 2008, mainly attributed to with foreign invested super-market chains taking the majority of the market share in big cities of China.

In accordance with the growth trend of inward FDI across sectors, foreign investors have realised the importance of China's advantages in terms of large market, fast economic growth and low labour costs for their investments and operations. Moreover, the rapid development of China's economy will encourage more potential investors to move in. On the other hand, the distribution of FDI also has important impact on China's industry structure and economic development. Therefore, the question of what factors affect the sector selection of FDI appears to be particularly important.

6.4. Methodology and Research Hypotheses

This section mainly discusses the hypotheses for this study and describes the model used for the regression analysis.

[60] *Labour intensive* refers to a process or industry that requires a large amount of labour to produce its goods or services.

As discussed in Chapter 5, in the theoretical literature of FDI studies, the motivation of FDI inflows can be classified into market-oriented FDI and resource-oriented FDI. They are usually weighted by the host area's GDP and labour costs (or employment), respectively. Therefore, large GDP and low labour costs (or national resources) are regarded as the most important factors to attract FDI inflows and this projection have been proved by many previous empirical studies (Wheeler and Mody, 1992; Barrell and Pain, 1996; Ali and Guo, 2005). Except for those two major factors, many other variables have been mentioned and analysed as the potential determinants of FDI, amongst which exchange rate, infrastructure, labour quality, openness degree, level of foreign investment are the most commonly tested factors in the previous studies. For example, Dixit (1989), Campa (1993) and Kiyota and Urata (2004) reported empirical evidence that exchange rate risk has a negative effect on FDI inflows. In addition, Cushman (1985) and Froot and Stein (1991) argued that currency depreciation of host areas has a positive impact on attracting FDI. Openness degree is another factor that may have a critical effect on FDI inflows. It is a measure of the extent to which an economy depends on trade with other countries or regions, usually calculated as the ratio of the sum of total imports and exports to GDP (Buenos Aires, 2000). Theoretically, the effect of openness degree on the inflow of FDI to an economy varies according to the motivation for engaging in FDI activities (Dunning, 1993; Markusen and Maskus, 2002; Navaretti and Venables, 2004). To some extent, host countries' attitudes towards international trade could have some influences on the level of FDI. In other words, a more open economy means that foreign investors are more familiar with the host economy and may therefore be more willing to invest in the country. In the studies by Ponce (2006) and Chantasasawat, et al (2004), the level of openness degree is found to be significantly related to FDI in Latin American and East Asia. For studies on the Chinese market, Lu (2000) and Na and Lightfoot (2006) found evidence that openness degree is a significant determinant for FDI on regional level.

The selection of potential independent variables for the regression analysis depends on data availability, the particular situation of China and the context of this study. This study mainly investigates the determinants of FDI at sector level through the development of a multivariate regression model for possible key factors that may influence FDI sector choice. The possible explanatory variables that are considered in this study thus include: market size (output), labour resources, labour costs and the level

of state ownership degree. State ownership degree is a potentially important factor for China as many of the industries are state-owned[61]. China is still on the transitional stage from a central-planned economy to market-oriented economy. Moreover, the country's openness degree could be seen as a proxy of the degree of China's economic reform or liberalisation level. It is commonly believed that higher openness degree in state-owned enterprises will encourage more FDI. Moreover, this study also includes some control variables that may affect the level of FDI such as exchange rates.

6.4.1. Research hypothesis

According to the above discussion, the following four hypotheses are to be tested in this study.

H1: *The larger the sector market size, ceteris paribus, the greater the inflow of FDI that sector would attract, i.e. market size is expected to be positively related to FDI volume.*

In fact, one of the most important purposes for multinational-enterprises invest overseas is to seek new potential market so it is often believed to have a direct effect on FDI inflows. A number of studies (Kravis and Lipesey, 1982; Blomstrom and Lipsey, 1991) have found that the larger the market size in a particular region, the more FDI the region attracts. This study uses the gross industry production (*IP*)[62], i.e. GDP by industry, as a proxy for market size.

H2: *High labour costs in a sector are expect to have a negative impact on the level of inward FDI, thus, the higher the labour costs, the lower amount of FDI in this sector.*

Seeking labour resources or low cost labour is another critical motivation for multinational enterprises with the ultimate goal of profit maximisation. Firms must take every effort to cut down their production costs which is directly influenced by labour costs. Coughlin, et al (1991) and Hill and Munday (1992) have found a close relationship between labour costs and FDI. However, some studies also found that more FDI inflows also affect the host area's wage rate by giving higher wages than domestic firms (Razin et al., 2005). That is mainly because multinational firms tend to use higher

[61] Ownership of firms in China can be divided into two major types: state owned or non-stated owned.
[62] GDP by industry is a measure of the contribution of each private industry and of government to the Nation's GDP. It is defined as an industry's gross output less its purchases of intermediate inputs.

wages as a means to attract high-quality workers. In this study the average wage rate of a sector is used as a proxy for labour costs.

H3: *Employment is expected to be negatively related to the level of FDI in a sector.*

Labour resources, or labour availability, should also have a close relationship to FDI inflows. China is a developing country with a large population which may attract multinational firms to shift labour-incentive industry from the home country to take advantage of the abundant labour force in China. Usually unemployment rate is used to measure labour availability (Friedman et al., 1992; Hill and Munday, 1992) and empirical evidence suggests that it is positively related to FDI (Coughlin et al, 1991; Billington, 1999). However, only employment figures are available on the sector level, which is measured as the number of staff and workers in every sector. Therefore, if unemployment has a positive effect on FDI, employment should affect the amount of FDI the other way round.

H4: *Sectors with higher state ownership degrees are expect to receive lower amount of FDI, thus a negative relationship should exist between state ownership degree and FDI.*

State ownership degree is particularly important for China, as before the 'opening-up' policy was announced in 1978, almost all industries are owned by the government. With the process of 'opening up and reform', the Chinese Government gradually opened more sectors to the private sector including foreign investors, especially after entering into the WTO. It is usually believed that lower state ownership degree will encourage FDI inflows because investors would naturally prefer to invest in an environment with a higher degree of market freedom. Some previous studies have found empirical evidence supporting this relationships in China (Fujita and Hu, 2001; Na and Lightfoot, 2006). State ownership degree is measured by the ratio of the number of staff and workers in state owned enterprises (SOEs) divide by the total number of staff and workers in that sector.

6.4.2. Model specification and analytical approach

Based on the above hypotheses, the regression model to be estimated is as follows:

$$FDI_{it} = \alpha_0 + \beta_1 Market_{it} + \beta_2 Wage_{it} + \beta_3 Employment_{it} + \beta_4 SOD_{it} + \chi_k \sum_k control_{kt} + \varepsilon_{it} \quad (6\text{-}1)$$

where the subscript denotes sectors *i* in year *t*, and the sample year spans from 1991 to 2008. α is an intercept term. $Market_{it}$, $Wage_{it}$, $Employment_{it}$ and SOD_{it} refer to the gross industry products, average wage rate, employment rate, and state ownership degree for sector *i* in year *t*, respectively. Control variables included in this analysis are *openness degree* and *exchange rate*. Owing to the lack of essential data on individual sectors, this study regards them as the control variables using national annual data.

According to previous studies (Fung, Iizaka and Siu, 2004; Pronce, 2006), openness degree is calculated as (Imports + Exports) / GDP. The exchange rate is calculated as the real effective exchange rate (*REER*) of Chinese Yuan (RMB) against 6 largest FDI source countries/regions (United States, Japan, Singapore, South Korea, Hong Kong and Taiwan), which constitute over 80% of total FDI inflows to China annually. The real exchange rate is a weighted average of a country's exchange rate against major foreign currencies, usually measured as an index, and adjusted for the effects of inflation to account for the real purchasing power of the host country's currency. In particular the real effective exchange rate is calculated as:

$$REER_t = \prod_1^i \left(\frac{d_{RMB,t} \times E_{RMB,i,t}}{d_{i,t}} \right)^{w_i} \quad (6\text{-}2)$$

In each year *t*, $E_{RMB,\,i}$ is the (indexed) exchange rate of Chinese Yuan against the currency of country *i*. d_{RMB} and d_i are the price deflators of China and country *i*, respectively, determined by the producer price index (PPI) for each country[63]. w_i is the weight of each major currency measured as the overall trade weight (import plus export) of country *i*.

The empirical approach applied in this study is the panel data model. Panel data model is the appropriate econometric model to use given the structure of the FDI sectoral choice data being of both cross-sectional and time-series dimensions. As we have mentioned before, the Hausman test (Hausman, 1978) is used to choose between fixed

[63] For countries where such data is not available, consumer price index (CPI) is used.

and random effect models. For this study, random effects models are used to estimate specifications. However, as robustness checks, results for both models will be reported for comparison. The difference between fixed and random effect panel data model in the context of this chapter is that the former assumes there exists a (unobserved) sector-specific effect correlated with the regressors. Although the fixed effects approach has the considerable virtue in the sense that there is little justification for treating the individual effects as uncorrelated with the other regressors as assumed in the random effects model, using fixed effect model mistakenly may affect the significance levels of coefficient estimates by introducing a large number of group-specific dummy variables. If the individual effects are strictly uncorrelated with the regressors, then it might be appropriate to model the individual specific constant terms as randomly distributed across cross-sectional units.

However Eq (6-1) does not consider the persistence of the dependent variable. In order to allow for the effect, lagged dependent variables are included in Eq (6-1) in a dynamic panel setting. This approach to panel data models involves the use of a dynamic effect, in this case adding a lagged dependent variable to the explanatory variables. The main theoretical justification for dynamic panel model is that it adopts a partial adjustment based approach. In addition, the lagged dependent variable can remove any autocorrelation. The detailed model setting and estimation methods are discussed in Chapter 4 of this thesis. The dynamic model to be considered in this chapter is as follows:

$$FDI_{it} = \alpha_0 + \lambda FDI_{i,t-1} + \beta_1 Market_{it} + \beta_2 Wage_{it} + \beta_3 Employment_{it} + \beta_4 SOD_{it} + \chi_k \sum_k control_{kt} + u_i + \varepsilon_{it} \quad (6\text{-}3)$$

Equation 6-3 is a first order dynamic model (including AR (1)), where u_i is a fixed-effect, and ε_{it} is a random disturbance. The dynamic fixed effects model we have chosen is generally more appropriate than a random effects model for many macro datasets for two reasons. First, if the individual effect represents omitted variables, it is highly likely that these individual-specific characteristics are correlated with the other regressors. Second, it is also fairly likely that a typical macro panel will contain individuals selected for the specific study, rather than a randomly selected sample from a much larger universe.

The generalised methods of moments (GMM) estimator proposed by Arellano and Bond (1991) and Arellano and Bover (1995) is used to solve the problem of autocorrelation

between the lagged dependent variable and the dependent variable, where the OLS or static panel data estimates are biased and/or inefficient. A large proportion of the recent empirical work in econometrics, particularly in macroeconomics and finance, has employed GMM estimators. This technique is basically a method that chooses parameter estimates, such that the theoretical model is satisfied as 'closely' as possible. The estimates are chosen to minimise the weighted distance between the theoretical and actual values. This method requires that the theoretical relations between the parameters satisfy so called 'orthogonality conditions', which means that the sample correlations between the explanatory variables and instruments is as close to zero as possible. There are basically two approaches: the Arellano-Bond (Arellano and Bond, 1991) and Arellano-Bover (Arellano and Bover, 1995) approach. The main difference between them is the way that the individual effects are included in the model, with the Arellano-Bond method using differencing and the Arellano-Bovver approach using orthogonal deviations. In this chapter, the robust two-step GMM model by Blundell and Bond (1998) is used, which is an extension of the Arellano and Bond (1991) model.

A key assumption for the appropriateness of GMM estimators is that the instrumental variables used in the regressions are exogenous. In order to test the validity of the instruments used, either the Sargan (Sargan, 1958) or Hansen (Hansen, 1982) test of overidentifying restrictions is used in empirical studies. However both should not be relied upon too faithfully as they have their own advantages and disadvantages (Roodman, 2008). The Hansen statistic is a more consistent and therefore more 'robust' estimator than the Sargan statistic especially in a one-step model. However the effectiveness of the Hansen test will be dramatically weakened as the number of instrumental variable used in the regression increases (Bowsher, 2002). Unfortunately, although some studies have been undertaken (Windmeijer, 2005; Roodman, 2009), there is no conclusive answer as to the optimal number of instruments that should be used. In this study the Sargan test statistics are reported whilst the Hansen test is used as a robustness check.

Moreover, both static and dynamic panel data models are re-examined in logarithm terms. Coefficient estimates of linear regressions show the marginal effects of independent variables on the dependent variable. The logarithm transformation of the variables enables the easy inference of the effect of percentage changes in explanatory

variables on dependent variables, i.e. elasticises. Further, log-linear models have other merits. First and in the context of this study, this methodology circumvents the problem of inconsistent magnitude of coefficient estimates between variables because by definition the coefficients in log equations are interpreted in relative rather than absolute terms. Second, log-linear model may be a more appropriate methodology for certain functional forms, such as the Cobb-Douglas production function.

6.5. Sample and Data Descriptives

This section will introduce the data used in this study including data sources, sample selection and describes data statistics.

This study examines the determinants of sector-level FDI distribution in China. The independent variable used in the empirical analysis is the amount of FDI in the 14 sectors mentioned in section 6.4. The independent variables include market size, average wage rate, employment and state ownership degree for every sector. In addition, two control variables (openness degree and exchange rate) are incorporated in the regression models. All variables are defined in Section 6.4. All data except openness degree and exchange rates are collected from the Statistic Year Book of China (National Statistic Bureau of China, 1990-2008 editions). The data for openness degree are obtained from China Economics Information and Statistics Database[64]. The nominal exchange rates are collected from the State Administration of Foreign Exchange and the price index data are collected from relevant official government database for each country. The sample period for this study is from 1991 to 2008.

Similar with the last chapter, this research also chooses 'the amount of actually utilized' from the three FDI figures listed on the yearbook (the other two are 'the amount of total investment' and 'the amount of agreed investment'). There are also two figures of employments for individual sectors—the 'number of staff and workers at year-end by sector' and the 'number of employment persons at year-end by sector'. Here, the former is adopted for this study to measure employment rate in each sector because data for employment persons at year-end by sector is highly incomplete. State ownership degree represents the extent of a sector's market freedom level and privatisation level. It is calculated as the number of staff and workers employed by state owned enterprises divided

[64] The detailed information of those two databases is introduced in Chapter 4.

by the total number of staff and workers employed in China for a particular sector. The openness degree variable measures the degree of openness of China's economy. Similar to previous studies (Buenos Aires, 2000; Al-Sadig, 2009), the variable is defined as the sum of exports and imports divided by GDP. Two dummies of general industrial classifications (*Second* and *Service*) are also included in the analyses[65]. *Second* is a dummy variable equal to 1 if the sector is one of mining and quarrying, manufacturing, electricity, gas and water production and supply, and 0 otherwise. *Service* is a dummy equal to 1 if the sector belongs to circulation and service industries and 0 otherwise. The circulation industry includes transportation, storages, post and telecommunication, and wholesale & retail trade & catering services. The service industry comprises of finance and insurance; real estate management; social services; health care, sports and social welfare; education, culture and arts, radio, film and television; and scientific research and polytechnic services.

Table 6.2 and Table 6.3 report the descriptive statistics for regression variables. Table 6.2 presents the summary statistics for the pooled data which include the mean, standard deviation, minimum and maximum value for all variables. From this table, it can be seen that the state ownership degree varies dramatically among sectors from 14.95% to 99.7%, and the mean values is 72.95% which implies that the Chinese market is still dominated by SOEs and has a long way to go before economic liberalisation.

Table 6.2

Descriptive statistics: pooled sample

Variables	Observations	mean	Std. Dev.	Min	Max
FDI (USD Mil)	218	2,938.16	7,764.00	0.00	43,017.24
Employment ('000 person)	218	7,381.90	8,218.00	480.00	52,930.00
Wage (RMB)	218	11,800.18	8,456.60	1,652.00	49,435.00
SOD (%)	218	72.95	21.21	14.95	99.70
Market (RMB Billion)	218	716.35	1110.09	7.90	8746.50
Openness degree (%)	218	44.34	12.50	31.81	66.52
Exchange rate (1991=100)	218	49.81	17.28	31.99	100.00
Second	218	0.24	0.43	0	1
Service	218	0.68	0.47	0	1

In order to compare the differences between sectors, this study also compares the summary statistics of each of the 14 sample sectors (Table 6.3). In terms of FDI inflows in different sectors, manufacturing attract the highest amount of FDI inflows in China, and the real estate and social service sector are ranked the second and third, respectively.

[65] The remaining industry classification is the *primary*, or *agriculture*, industry includes farming, forestry, animal husbandry and fishery.

With respect to employment, manufacturing is still ranked the first on the number of staff and workers among all sectors, followed by wholesale & retail trade and catering services, and then education, culture and arts, radio. As for labour costs, finance and insurance has the highest average wage paid to employees (RMB18,159), followed by electric power, gas and water production and supply (RMB17,710) and scientific research & polytechnic services (RMB15,182). Farming, forestry, animal husbandry and fishery is the sector with the lowest wage rate (RMB5,312). The distribution of state ownership degree is highly unbalanced. For example, the average percentage of manufacturing sector owned by the state only accounts for about 36.6% whilst for some other sectors such as farming, forestry, animal husbandry and fishery, geological prospecting and water conservancy, and education, culture and arts, radio, film and television the average state ownership degree is more than 90%. Regarding the market size of each sector, manufacturing is still the largest in term of the contribution to GDP, followed by farming, forestry, animal husbandry and fishery. Both openness degree and exchange have some changes year by year, but by definition they do not vary across sectors.

Table 6.3

Descriptive statistics for regression variables by sector

variables	means	Std. Dev.	Min.	Max.	means	Std. Dev.	Min.	Max.	means	Std. Dev.	Min.	Max.
	Sector 1 farming				Sector 2 construction				Sector 3 manufacturing			
FDI	737.38	258.28	139.71	1114.34	838.70	471.09	69.86	2064.23	33360.75	7428.69	22603.34	43017.24
Employment	550.06	129.53	386.00	769.00	905.12	133.18	733.00	1153.00	3530.08	816.88	2899.00	5293.00
Wage	5312.47	2713.11	1652.00	11086.00	8868.41	4657.32	2649.00	18758.00	11424.50	4906.78	5642.00	20884.00
SOD	95.43%	0.68%	94.20%	96.36%	47.04%	12.51%	25.82%	60.78%	36.60%	16.00%	14.95%	60.80%
Market	1506.38	640.24	528.90	2862.70	611.67	362.59	101.50	1426.40	4247.75	2106.09	2118.00	8746.50
Openness degree	43.57%	12.63%	31.81%	66.52%	43.57%	12.63%	31.81%	66.52%	46.73%	13.71%	31.81%	66.52%
Exchange rate	50.80	18.94	31.99	100	50.80	18.94	31.99	100	43.68	3.93	31.99	46.54
variables	means	Std. Dev.	Min.	Max.	means	Std. Dev.	Min.	Max.	means	Std. Dev.	Min.	Max.
	Sector 4 Mining and Quarrying				Sector 5 elec,gas,supply				Sector 6 geological and water			
FDI	542.83	188.10	283.73	940.33	1997.87	888.57	1072.55	3702.74	56.09	94.78	0.00	272.83
Employment	605.25	139.41	481.00	886.00	286.92	7.77	272.00	298.00	146.69	33.79	96.00	202.00
Wage	13409.58	7492.69	6482.00	28377.00	17710.00	8109.53	8816.00	33809.00	9493.13	4878.35	2707.00	19064.00
SOD	67.29%	18.04%	43.52%	91.38%	78.99%	8.53%	66.72%	92.12%	95.58%	4.47%	87.77%	99.70%
Market	668.66	345.33	340.80	1346.10	520.26	204.77	241.70	960.90	41.56	31.84	7.90	110.50
Openness degree	46.73%	13.71%	31.81%	66.52%	46.73%	13.71%	31.81%	66.52%	44.30%	12.66%	31.90%	66.52%
Exchange rate	43.68	3.93	31.99	46.54	43.68	3.93	31.99	46.54	51.1	19.52	31.99	100
variables	means	Std. Dev.	Min.	Max.	means	Std. Dev.	Min.	Max.	means	Std. Dev.	Min.	Max.
	Sector 7 Transport				Sector 8 wholesale and retail				Sector 9 finance and insurance			
FDI	1039.77	647.48	87.32	2006.76	1411.35	858.09	91.69	3718.17	126.52	102.75	4.37	293.69
Employment	753.12	95.07	613.00	921.00	1237.12	518.55	651.00	1844.00	275.43	31.25	208.00	311.00
Wage	15108.00	11501.38	2686.00	38830.00	7926.77	5172.47	1981.00	18965.00	18159.29	14479.36	2255.00	49435.00
SOD	77.94%	6.22%	63.95%	83.31%	51.09%	8.07%	33.59%	58.44%	64.22%	10.82%	41.40%	76.05%
Market	701.84	602.22	140.90	2080.60	904.88	654.75	208.90	2441.30	518.98	314.14	128.60	1333.20
Openness degree	43.57%	12.63%	31.81%	66.52%	43.57%	12.63%	31.81%	66.52%	45.77%	12.90%	31.90%	66.52%
Exchange rate	50.80	18.94	31.99	100	50.80	18.94	31.99	100	52.94	20.11	35.87	100

Table 6.3 (Continued)

variables	means	Std. Dev.	Min.	Max.	means	Std. Dev.	Min.	Max.	means	Std. Dev.	Min.	Max.
	Sector 10 Real estate				Sector 11 social service				Sector 12 Health, sport, welfare			
FDI	5504.03	3542.50	240.13	17088.73	2182.33	1644.96	0.00	4741.51	86.61	57.90	4.37	195.35
Employment	94.76	29.03	48.00	151.00	384.82	98.31	215.00	483.00	463.18	31.59	410.00	521.00
Wage	12386.82	7013.73	2507.00	26425.00	10700.47	6515.01	2431.00	24258.00	11712.47	7762.26	2370.00	28412.00
SOD	60.63%	19.07%	27.14%	83.08%	62.39%	8.88%	48.99%	71.79%	87.28%	1.80%	82.89%	89.09%
Market	317.69	369.24	36.90	1227.80	329.07	226.21	44.80	776.90	123.36	114.30	21.70	380.40
Openness degree	43.57%	12.63%	31.81%	66.52%	43.57%	12.63%	31.81%	66.52%	43.57%	12.63%	31.81%	66.52%
Exchange rate	50.80	18.94	31.99	100	50.80	18.94	31.99	100	50.80	18.94	31.99	100
variables	means	Std. Dev.	Min.	Max.	means	Std. Dev.	Min.	Max.				
	Sector 13 education, Culture				Sector 14 Scientific research							
FDI	171.79	164.44	4.39	486.17	219.27	226.57	17.46	916.68				
Employment	1421.12	144.22	1181.00	1602.00	181.06	25.43	151.00	228.00				
Wage	11094.65	7791.63	2243.00	28258.00	15182.44	10940.40	2573.00	38879.00				
SOD	96.81%	0.99%	95.33%	98.32%	90.23%	4.94%	81.15%	97.42%				
Market	302.65	262.28	45.50	880.00	89.76	89.03	9.40	292.60				
Openness degree	43.57%	12.63%	31.81%	66.52%	44.30%	12.66%	31.90%	66.52%				
Exchange rate	50.80	18.94	31.99	100	51.1	19.52	31.99	100				

6.6. Empirical Results

Table 6.4 reports the results for the random effect panel data model on the determinants of sector-level FDI in monetary terms. Random effect model is chosen as a result of the Hausman test, which compares the coefficient estimates of random and fixed effect models. Specification I is the primary empirical model. The labour supply (*Employment*) is positively related to FDI. This does not necessarily mean that foreign investors tend to choose sectors with higher current employment – on the contrary, the relationship could be reversed (i.e. higher foreign investment increase the employment in a sector). This is confirmed when taking the time dynamics of the model into consideration and a negative relationship is found between current FDI and previous-year employment.

Consistent with the hypotheses, the market size (*Market*) of the sector is significantly and positively related to FDI inflows (H1) and labour costs (*Wage*, H2) and state ownership degree (*SOD*) have significantly negative effect on the level of FDI in a sector (H4). Note that the data on two control variables *Openness degree* and *Exchange rate* are of national-level (the value are the same for the whole country) owing to the data availability or by variable definition. Therefore, the interpretation of their coefficient estimates should be seen with caution. As expected, higher value of the Chinese currency is associated with lower level of FDI. The negative estimates for the openness degree are possibly a result of the variable's interaction with the market size variable as it uses gross domestic production (GDP) as denominator[66]. Specifications II and III test the sensitivities of the control variables and it is shown that removing any one of them does not alter the main empirical results. Specification IV yields some interesting findings by considering the interaction between different industries and the FDI determinants. It is shown that foreign investments are likely to cluster in the second industry and the effect of market size and labour costs are more pronounced in the second industry than third/tertiary industry, which mainly includes services sectors.

[66] When removing the sector gross output variable (*Market*), the coefficient estimates for openness degree becomes positive but also loses its explanatory power. The results are available upon request.

Table 6.4

Static panel data regression: FDI sector choice

Table 6.4 shows the regression results for equation (1). Specifications I, II, III and IV represent random effect regression results and specification V is fixed effects results. Specification II and III are the robustness tests for models without the control variable openness degree and exchange rate, respectively. Specification IV further considers the interaction term between industries (second and service/tertiary industry) and FDI determinant variables (*Market* and *Wage*). *Second* and *Service* are dummy variables set to be 1 if a sector belongs to second and third/tertiary industries, respectively, and 0 otherwise. Robust standard errors are shown in the parenthesis. χ^2 reports the Hausman test statistic by comparing the coefficient estimates for FE and RE models, *, **, ***stand for 90%, 95% and 99% significant levels respectively.

	I	II	III	IV	V
Variables	Random effect	Random effect	Random effect	Random effect	Fixed effect
Employment	80.35*	89.41**	85.41*	145.95***	-2.53
	(46.40)	(43.91)	(46.34)	(40.88)	(80.29)
Wage	-4.80*	-8.82***	-3.19	39.18**	-3.87
	(2.82)	(2.21)	(2.86)	(16.43)	(2.46)
SOD ($/10^3$)	-6.51**	-5.59**	-5.69**	-7.80***	-5.40*
	(2.78)	(2.71)	(2.72)	(2.97)	(2.81)
Market	26.09***	25.09***	26.76***	-13.02*	23.16***
	(4.18)	(4.02)	(4.32)	(5.94)	(5.02)
Openness Degree ($/10^3$)	-3.85**		-3.80**	-1.09	-3.19**
	(1.60)		(1.65)	(1.88)	(1.55)
Exchange Rate ($/10^3$)	-1.50***	-1.46***		-1.77***	-1.37**
	(0.57)	(0.57)		(0.52)	(0.64)
Second ($/10^6$)				0.27**	
				(0.12)	
Service ($/10^6$)				-0.10	
				(0.05)	
*Second * Wage*				-71.70***	
				(16.83)	
*Second * Market*				51.64***	
				(9.38)	
*Service * Wage*				-41.98**	
				(15.46)	
*Service * Market*				25.74***	
				(7.97)	
R^2(within)	-	-	-	-	0.49
adjusted R^2	0.75	0.74	0.75	0.81	0.72
χ^2	2.23	1.63	1.84	-	2.23
number of obs.	218	218	218	208	218
number of groups	14	14	14	14	14

Table 6.5 reports the results for re-estimating Equation (1) using the logarithm of all variables. The major empirical findings still remain although some variables (such as state ownership) lose explanatory powers when looking at their elasticities on the dependent variable. A 1% change in both employment and sector market size will increase FDI by around 0.5%. Exchange rate has a significant effect on FDI as a 1% increase in the value of the Chinese currency will decrease the amount of foreign investment by almost the same percentage. Surprisingly the effect of wage rate on FDI is positive, although the statistically inference is only marginal, if any. However, when considering the interaction between industries and FDI determinants, the wage rate factor is again significantly negatively associated with FDI in the second industry, which means low labour costs are a more important factor for attracting FDI in the manufacturing sector.

Our study also analyses an alternative econometric approach to the normal panel data. This involves using a dynamic panel data framework of Blundell and Bond (1998) model, which includes lags of dependent and independent variables in the estimation. This approach allows us to capture the persistent nature of the FDI variable. All right-hand side variables are the same as in static models but are lagged in their first orders to reduce possible endogeneity[67]. Table 6.6 shows the regression results for robust one-step GMM-system estimation (Blundell and Bond, 1998). Note that in all specifications there is strong evidence of significantly negative first-order serial correlation in differenced residuals (AR(1)) and no evidence of second-order serial correlation in the first-differenced residuals (AR(2)), which is a key requirement for the GMM estimators to be valid. Also for all specifications, the Sargan test of over-identifying restrictions are rejected but this could be associated with the findings by Blundell et al (2000) that the Sargan tends to over-reject when the GMM method is used. Given the problems of the Sargan test discussed in the methodology section, when the more robust Hansen test is used as an alternative, the hypothesis of over-identifying restrictions cannot be rejected (results not reported). A more general specification using both lagged and contemporaneous variables does not alter the results significantly but has increase the standard errors of the coefficient estimates[68] as such equation would reduce the already small sample size further. Also it is our intention to test the effect of the independent variables at the beginning of the accounting year on FDI in the subsequent year, which

[67] The estimation of a more general model to included both contemporary and lagged independent variables do not alter the results significantly but the statistical inference tends to be weaker.
[68] Results are available upon request.

is believed to better depict the causalities between dependent and independent variables[69].

Table 6.5

Elasticity analysis for FDI sector choice

Table 6.5 represents the estimate results for the logarithm transformation of Eq (6-1). Specifications I-VI report coefficient estimates for RE panel data models and VII for FE model. *Second* and *Service* are dummy variables set to be 1 if a sector belongs to second and third/tertiary industries, respectively, and 0 otherwise. All regressions include a constant term. Robust standard errors are shown in the parenthesis. *, **, ***stand for 90%, 95% and 99% significant levels, respectively.

	I	**II**	**III**	**IV**	**V**	**VI**	**VII**
Variables	R.E.	R.E.	R.E.	R.E.	R.E.	R.E.	F.E.
Ln(Employment)	0.48*	0.42*	0.51**	0.46**	0.21	-0.05	0.57**
	(0.25)	(0.22)	(0.24)	(0.22)	(0.23)	(0.25)	(0.27)
Ln(Wage)	0.44*	0.13	0.36	0.16	-0.07	0.96	0.42
	(0.25)	(0.21)	(0.23)	(0.20)	(0.23)	(0.97)	(0.29)
Ln(SOD)	*0.36*	0.13	0.50		-0.19	-1.83*	0.34
	(0.38)	(0.35)	(0.31)		(0.38)	(1.00)	(0.37)
Ln(Market)	0.50**	0.45**	0.48**	0.39**	0.68***	*-0.89*	0.15
	(0.20)	(0.19)	(0.21)	(0.17)	(0.18)	*(1.23)*	(0.25)
Ln(Openness degree)	-0.40				-0.33	-0.19	0.22
	(0.45)				(0.43)	(0.96)	(0.41)
Ln(Exchange Rate)		-0.94***		-0.97***	-0.98***	-1.12***	-0.90***
		(0.34)		(0.30)	(0.35)	(0.37)	(0.26)
Second						4.27	
						(4.66)	
Service						-5.53	
						(4.00)	
*Second * Ln(Wage)*						-2.65***	
						(0.95)	
*Second * Ln(Market)*						2.16*	
						(1.20)	
*Service * Ln(Wage)*						-0.90	
						(1.00)	
*Service * Ln(Market)*						1.34	
						(1.20)	
R^2(within)	-	-	-	-	-	-	0.38
adjusted R^2	0.36	0.40	0.32	0.39	0.52	0.58	0.31
χ^2	13.50*	12.12*	13.86**	7.54	37.51***	-	37.51***
number of obs.	208	208	208	208	208	208	208
number of groups	14	14	14	14	14	14	14

[69] Recall that a positive coefficient estimate for year-end employment may just be a result that high volume of FDI creates more jobs in a sector.

In the primary specification (Specification I) there is strong evidence of the persistence of the dependent variable. As predicted, FDI responds positively to market size and negatively to the degree of state ownership. More importantly, lagged employment is negatively correlated with FDI, consistent with the hypothesis that FDI is positively related to labour availability (H2), which will be reduced by the high employment number in the previous year. Wage rate has a positive effect on FDI, possibly implying that foreign investors care more about the quality of the labour force in China, which is usually proxied by a higher wage rate. As expected, FDI decreases with the increase in the value of RMB against foreign currencies, when investing in China is more costly for foreign countries.

Both the openness degree and exchange rate variables use country-level instead of sector-level data so by construction they are highly correlated with the year effect in the dynamic panel data model. Specification II removes these two variables to check the robustness of the main results and it is found that they are not the main driver of the primary results, which hold without the two variables.

The last three specifications in Table 6.6 investigate the effects of industry classifications and their interaction with explanatory variables on FDI sector distributions. The results are generally weaker than the static panel data regressions which use random effect models. Perhaps a more interesting question is how market integration and liberalisation, in the context of this study state ownership and openness degrees, influence foreign investors' decision to invest among sectors. Specification V shows that it is for the service industry that both market liberalisation (lower state ownership) and integration (high openness degree) have significant effects on FDI in these sectors.

Table 6.6

Dynamic panel data regression: FDI sector choice

Table 6.6 shows the regression results for robust one-step GMM-system estimation (Blundell and Bond, 1998) in a dynamic panel data model. Sargan is a χ^2 test of overidentifying restrictions. *Second* and *Service* are dummy variables set to be 1 if a sector belongs to second and third/tertiary industries, respectively, and 0 otherwise. A constant term is included in each specification. Asymptotic robust stand errors are reported in parenthesis. *, **, ***stand for 10%, 5% and 1% significant levels respectively.

Specifications	**I**	**II**	**III**	**IV**	**V**
FDI_{t-1}	0.989***	0.961***	0.985***	0.966***	0.981***
	(0.039)	(0.037)	(0.041)	(0.036)	(0.041)
$Employment_{t-1}$	-30.014**	-19.663	-22.525*	-25.323*	-25.270**
	(14.480)	(13.348)	(12.703)	(14.762)	(11.049)
$Wage_{t-1}$	1.454**	1.380*	1.402*	23.332	1.384*
	(0.741)	(0.719)	(0.782)	(20.394)	(0.834)
$SOD_{t-1}(/10^6)$	-0.179*	-0.238	-0.199*	-0.226*	-0.146
	(0.112)	(0.153)	(0.123)	(0.121)	(0.123)
$Market_{t-1}$	5.198**	5.983***	5.526**	-6.219	7.070**
	(2.305)	(2.251)	(2.613)	(9.320)	(3.175)
$Openness_{t-1}(/10^6)$	-1.398		-1.338	-0.463	-1.272
	(4.304)		(4.216)	(4.572)	(4.184)
$Exchange\ Rate_{t-1}$ $(/10^3)$	-2.334***		-2.405***	-2.586***	-2.655***
	(0.466)		(0.623)	(0.654)	(0.654)
Second $(/10^3)$			-8.017	-47.043	
			(52.891)	(37.344)	
Service $(/10^3)$			33.424	-38.866	
			(41.228)	(38.875)	
$Second * Wage_{t-1}$				13.443*	
				(8.094)	
$Second * Market_{t-1}$				-25.508	
				(20.336)	
$Service * Wage_{t-1}$				10.974	
				(8.828)	
$Service * Market_{t-1}$				-20.920	
				(20.264)	
$Second * SOD_{t-1}$ $(/10^6)$					0.016
					(0.072)
$Second * Openness_{t-1}(/10^6)$					-0.012
					(0.015)
$Service * SOD_{t-1}$ $(/10^6)$					-0.079*
					(0.041)
$Service * Openness_{t-1}(/10^6)$					0.257**
					(0.104)
Year Effects	Yes	Yes	Yes	Yes	Yes
Instruments	t – 2, t – 19; t – 1	t – 2, t – 19; t – 1	t – 2, t – 19; t – 1	t – 2, t – 19; t – 1	t – 2, t – 19; t – 1
AR(1) (*p-value*)	0.016	0.014	0.017	0.018	0.015
AR(2) (*p-value*)	0.293	0.292	0.296	0.338	0.286
Sargan (*p-value*)	0.000	0.000	0.000	0.000	0.000
number of obs.	215	215	215	215	215
number of groups	14	14	14	14	14

Again we examine the elasticity of the explanatory variables on FDI but in a dynamic panel setting and the results are reported in Table 6.7. For all specifications the Sargan test of over-identifying restrictions cannot be rejected and the absence of second-order serial correlation in the first-differenced residuals guarantees the validity of the regressions. The empirical findings are similar but are weaker in terms of statistical inferences. Specification I shows that a 1% increase in state ownership degree will reduce FDI in this sector by 0.4%. The effect of 1% increase in the value of Chinese currency is a decrease in FDI by 0.6% but the impact is only marginally significant. The effect of market size and labour costs is larger in manufacturing (second) industry than the service (third) industry, consistent with the findings in static panel data models. Higher state ownership constitutes a major barrier for foreign investors to invest in the service industry, as 1% increase in state ownership degree reduces foreign investment by almost 15% whilst controlling for all other variables. Interestingly, higher degree of market integration (openness degree) in the second industry does not help attracting foreign investment compared to other sectors especially the service industry. This is probably because the international trading volume in the second industry is dominated by domestic exporters, which is obvious not a driver of (if not a barrier to) foreign investment.

6.7. Conclusions

This chapter undertakes an empirical investigation on the determinants of FDI inflows into China at sector levels for the period 1991-2008. In common with most previous studies, this study examines explanatory variables including market size, employment, wage rate, openness degree, exchange rate, and one Chinese specific variable – state ownership degree. Consistent with most of the hypotheses, the key results of this study are summarised in table 6.8. For the static, random effects panel data estimations, all coefficient estimates are consistent with hypotheses in this study except for employment. The estimate of state ownership degree loses its significance in the elasticity analysis and labour costs become marginally positive. In terms of GMM estimations, all coefficient estimates are consistent with the predictions by the hypotheses except for labour cost, which has a marginally positive influence on FDI inflows. For elasticity analysis using GMM estimators, market size, labour cost and employment rate have no significant effect on FDI while other variables are related to FDI as predicted.

Table 6.7

Dynamic panel data regression: Elasticity analysis

Table 6.7 shows the regression results for robust one-step GMM-system estimation (Blundell and Bond, 1998) in a dynamic panel data model. The dependent variable is the logarithm of FDI in year *t*. Sargan is a χ^2 test of overidentifying restrictions. *Second* and *Service* are dummy variables set to be 1 if a sector belongs to second and third/tertiary industries, respectively, and 0 otherwise. All regressions include a constant term. Asymptotic robust stand errors are reported in parenthesis. *, **, ***stand for 10%, 5% and 1% significant levels respectively.

Specifications	**I**	**II**	**III**
Ln(FDI) $_{t-1}$	0.839***	0.810***	0.815***
	(0.064)	(0.067)	(0.067)
Ln(Employment) $_{t-1}$	-0.113	-0.174	-0.099
	(0.086)	(0.129)	(0.127)
Ln(Wage) $_{t-1}$	0.240	0.967	0.289
	(0.256)	(0.743)	(0.268)
Ln(SOD) $_{t-1}$	-0.411**	-0.325	14.200
	(0.184)	(0.238)	(8.983)
Ln(Market) $_{t-1}$	0.166	-0.458	0.135
	(0.127)	(0.426)	(0.168)
Ln(Openness Degree) $_{t-1}$	-5.407	-5.166	-4.628
	(6.412)	(5.959)	(6.793)
Ln(Exchange Rate) $_{t-1}$	-0.582*	-0.442	-0.698*
	(0.311)	(0.340)	(0.385)
Second			-1.691**
			(0.788)
Service			-1.255*
			(0.710)
*Second * Ln(Wage)* $_{t-1}$		-0.936**	
		(0.457)	
*Second * Ln(Market)* $_{t-1}$		0.866**	
		(0.386)	
*Service * Ln(Wage)* $_{t-1}$		-0.754	
		(0.487)	
*Service * Ln(Market)* $_{t-1}$		0.680*	
		(0.414)	
*Second * Ln(SOD)* $_{t-1}$			-14.758
			(9.069)
*Second * Ln(Openness)* $_{t-1}$			-0.966**
			(0.464)
*Service * Ln(SOD)* $_{t-1}$			-14.867*
			(8.962)
*Service * Ln(Openness)* $_{t-1}$			-0.438
			(0.396)
Year Effects	Yes	Yes	Yes
Instruments	t – 2, t – 19; t – 2	t – 2, t – 19; t – 1	t – 2, t – 19; t – 1
AR(1) (*p-value*)	0.085	0.084	0.085
AR(2) (*p-value*)	0.920	0.918	0.906
Sargan (*p-value*)	0.325	0.286	0.479
number of obs.	205	205	205
number of groups	14	14	14

These results provide some valuable insights onto the sector distribution of FDI in China, that rapid economic growth, potential large market, rich labour resources and low labour costs are the main motivations of foreign investment in a certain sector. More importantly, it is shown that the common determinants of FDI such as market size and labour costs are most important considerations when investing in the second industry, whilst the extent of economic reform and market liberalisation, proxied by state ownership degree and openness degree, have a larger influence on the third, or service industry.

Table 6.8

Summary of hypotheses and empirical results

Hypothesis	**Prediction**	**Static panel data estimation**	**Elasticity analysis**	**GMM estimation**	**Elasticity analysis for GMM**
I. market size	Positive effect	Positive effect	Positive effect	Positive effect	No effect
II. labour cost	Negative effect	Negative effect	Positive effect (marginal)	Positive effect	No effect
III. employment	Negative effect	Positive effect	Positive effect	Negative effect	No effect
IV. ownership degree	Negative effect	Negative effect	No effect	Negative effect	Negative effect

CHAPTER 7
The Effect of FDI on Domestic Investment: Crowding Out or Crowding In?

7.1. Introduction

FDI in China has been one of the major success stories over the past 30 years. With the rapidly increasing inflows of FDI, China's economy has experienced dramatic changes as well. The regional and sectoral distributions of FDI in China for the past three decades have been analysed in Chapters 5 and 6. This chapter will shift the attention to the effects of FDI on China's economy.

Nowadays foreign invested enterprises (FIEs) are no longer a peripheral phenomenon, but rather a considerable part of the Chinese economy. The effects of FDI are usually related to domestic economic policies, industrial structures, and the development of regional domestic enterprises. Inflows of FDI have not only brought new capital and increased employment, but also introduced advanced technologies and management skills through knowledge and technology transfer (spill-over). In many cases, FDI has imposed positive effects on domestic investment through healthier competition. However, if FDI flows into sectors where there already exist plenty of domestic producers, multinational enterprises can take advantage of their advanced R&D ability, experienced production management and efficient marketing to compete with domestic enterprises which are often in a disadvantageous position regarding those aspects, and therefore may displace domestic investment in these sectors. In another word, FDI is more likely to take away investment opportunities otherwise would be undertaken by domestic investors when foreign investments are made in areas with existing domestic producers, or 'crowd out' domestic investors. Of course, FDI could also 'crowd in', or complement, domestic investment through spill-over effects. In addition, with the prominent differences in the economic development across regions and sectors in China, the study on FDI displacement effects should be carried out separately at both regional and sectoral levels.

Presently, evidence for FDI displacement effects in China is fairly limited and many aspects of the research question are still left unaddressed because of the lack of relevant

and reliable data. Consequently, the key research questions in this chapter are: first, whether or not FDI has crowded in/out domestic investment and second, if so, whether or not there are any regional or sectoral differences regarding the crowding in/out effect in China. Thus, the task of this chapter is to empirically investigate the possible displacement effects of FDI inflows on Chinese domestic investment for different regions and sectors, respectively.

More specifically, the aim of this study is to investigate whether the increasing FDI inflows in China since 1990s have any displacement effect (crowding in or crowding out) on Chinese domestic investment. This leads to two particular research objectives: 1) introduce the theoretical framework and model specifications for FDI displacement effects; 2) empirically test the displacement effect models using both regional- and sector-level data.

The regional analysis in this study shows that for the whole sample period 1990-2008, FDI is proved to have a crowding out effect on China as a country and the eastern area of China, but in the middle area of China, there is a crowding in effect. FDI does not appear to have any displacement effect in the western area of China. For sectoral analysis, this study does not find any significant relationship between FDI and domestic investment, which is different from the results of the regional analysis.

This chapter proceeds with the following five sections. Section 7.2 discusses the general influences of FDI on China's economy. Section 7.3 will review previous empirical studies on FDI crowding out (or in) effects. Section 7.4 will describe the model specifications used in this chapter and the main hypotheses. Section 7.5 discusses data collection and empirical methodologies. Section 7.6 reports and discusses the regression results. Section 7.6 will summarise and conclude this chapter.

7.2. Influences of FDI on China's Economy

Since the announcement of the 'reform and opening up' policy, China's economy has been in a stage of rapid development with average annual GDP growth rates of over 9% for many years. There is little doubt that FDI has contributed significantly to the economic development in China. With more and more FDI flowing into China's domestic market, the effects of FDI become a new topic that is worth exploring. Research questions that have been extensively studied include economic growth,

employment, technology spill-over effects and so on (Graham and Wada, 2001; Cheung and Lin, 2004; Sjöholm, 2008).

According to previous literature, the influences of FDI on China's economy could be classified into four aspects: job creation, trade expansion, technology improvement and economic growth promotion. Firstly, in terms of job creation, FDI is generally found to have a positive effect over the past several years (Junlin, 2007). In the three stages of 1986-1990, 1991-1996 and 1997-1999, FIEs have create 60,000, 3,750,000 and 720,000 new job positions, respectively, which accounted for 0.43%, 9.62% and 6% in total new job positions created at that stage (Junlin, 2007). However, compared to its contribution to capital accumulation, FDI's effect on job creation is not entirely beneficial to the domestic market. For example, whilst FIEs provide new job opportunities, they have also undermined the original employment patterns in China. Secondly, with respect to trade expansion, FIEs have greatly promoted export growth and have become the main driving force of China's international trade. In 1985, FIEs involved in export only accounted for about 1% of total export in China. This figure has increased to more than 50% in recent years. In some particular sectors such as manufacturing, the figure is even higher. Thirdly, FDI's effects on technology improvement are quite complex and difficult to evaluate. However, some scholars (e.g. Graham and Krugman, 1991) suggest that domestic firms have better knowledge and access to domestic markets, and if a foreign firm decides to enter the market they must do so with lower costs and higher production efficiency than its domestic competitors. It is likely that higher efficiency of FDI would result from a combination of advanced technology and management skills especially in the case of developing countries. Thus, FDI may be considered as the main channel through which advanced technologies are transfer to developing countries. The development of China's industry structure and change of the export structure would be a good reflection for FDI's impacts on technologies.

Finally, FDI can promote China's economic growth via two aspects: capital accumulation and factors of production[70]. The most difficult aspect in evaluating FDI's contribution to capital accumulation is how to measure, and thus remove the 'crowding out' effect of FDI, i.e. the displacement of domestic investment as a result of foreign

[70] In economics, factors of production (or productive inputs) are the resources employed to produce goods and services. They facilitate production but do not become part of the product (as with raw materials) or are significantly transformed by the production process (as with fuel used to power machinery).

investment. Many scholars believe that there exists an FDI crowding out effect on Chinese domestic investment (Huang, 2003; Buckley et al., 2002) due to China's high saving rates and preferential policies to FDI. Therefore, they argue that FDI's contribution to capital accumulation is limited and FDI promotes China's economic growth mainly through factors of production. However, some other studies were not able to find any definite proof for FDI crowding out domestic investment in China (Agosin and Machado, 2005; Wang and Li, 2004).

7.3. Literature Review

The question of whether or not FDI will displace domestic investment especially in developing world has been a topic of academic debate for years. Empirical evidence on the impacts of FDI on domestic investment varies. In general, there are three prevailing views from previous literature, namely crowding in (Agosin and Machado, 2005; Bosworth and Collins, 1999), crowding out (Fry, 1993; Agosin and Machado, 2005) and no effect (Wang and Li, 2004). Table 7.1 illustrates the results from selected previous research on FDI displacement effect in developing countries and transformation economies. It is worth mentioning that according to previous research, crowding in and spill-over effects are closely related to each other. Spill-over effects may on one hand induce domestic investment so far as new knowledge is applied and new technologies implemented; on the other hand, it is complementary to domestic investment which may create the necessary preconditions for the realisation of spill-over effects in the first place. Therefore, crowding in effects are usually accompanied with spill-over effects in domestic investment.

Specifically, Borensztein et al. (1998) tested the effect of FDI on economic growth and domestic investment in a cross-country framework using data on FDI inflows from 69 developing countries over a twenty-year period. Their results are supportive of a crowding in effect, where a one dollar increase in the net FDI inflows is associated with an increase in total investments in the host economy by more than one dollar. From their empirical evidence, it appears that the main channel through which FDI contributes to economic growth is by stimulating technological progress, rather than by increasing total capital accumulation in the host economy. In addition, this study also suggests that FDI is an important vehicle for the transfer of technology, contributing relatively more to growth than domestic investment.

Bosworth et al. (1999) used multiple regression analysis to evaluate the implications of capital inflows in fifty-eight developing courtiers between 1978 and 1995. In this study, they divided capital inflows into three different types—FDI, portfolio investment, and other financial flows such as bank loans—and examined each of them separately. The empirical results show remarkable differences among different types of capital inflows. Particularly, FDI appears to have a highly beneficial effect on domestic investment with a one for one relationship. In contrast, portfolio investment is found to have no explicit impact on domestic investment, and the effect of loans lies in-between the other two.

In addition, Agosin and Machado (2005) investigated the displacement effect of FDI on domestic investment in developing countries over a 26-year period since 1970. They examined the data for three developing regions—Africa, Asia and Latin American. Their results indicate a strong FDI crowding in effect in Asia, and a crowding out effect in Latin America. In Africa, FDI has increased overall investment on a one-to-one ratio, which means it has no notable effect on domestic investment. Moreover, when the sample period was divided into two sub periods (1976–1985 and 1986–1996), the results vary only for Africa, which appears to have crowding in effects rather than no effects. Similar research has been undertaken by other researchers such as Fry (1993) and Misun and Tomsik (2002).

In terms of research in China, there are also no consistent findings from the previous literature. Studies on FDI displacement effect in China has become a concern only in recent years. Earlier studies on the effect of FDI are mainly focused on economic growth, performance of firms and/or technology spill-over. Buckley et al (2002) tested the impact of inward FDI on the performance of Chinese domestic firms for the manufacturing sector. They provided support for the crowding out hypothesis, showing that overseas investments in China have substituted those by domestic state-owned enterprises in industries where their products are competing directly with each other (e.g. textiles and food).

Huang (2003) did not directly examine the question of crowding in/out effect in China. However, his research shed lights on some important problems in the relationship between domestic private enterprises and FIEs in China. In his book, he argued that China might have been absorbing more FDI than necessary for welfare maximising, in the sense that the Chinese Government has provided too many policy or financial

benefits to FIEs, which have prevented domestic private enterprises from competing with foreign investors on equal terms. Therefore, his analysis strongly suggests the existence of a crowding out impact of FDI on domestic investment.

Wang and Li (2004) quantified the effects of FDI on domestic investment using a larger sample of panel data and compared the different estimates from 'absolute' and 'relative' models. They did not find any significant crowding in or out effects in China on the country level. However, further analysis in this study revealed significant regional differences, with crowding out effect dominating in eastern China and crowding in effect in mid China, and no significant effect found in western China.

Table 7.1

Previous researches dealing with FDI crowding effects and their results

Research paper	Identification of crowding in	Identification of crowding out	No effect
Borensztein, Gregorio and Lee (1998)	69 developing countries	–	–
Bosworth, Collins and Reinhart (1999)	58 developing countries (FDI)	–	58 developing countries (portfolio investment)
Agosin and Machado (2005)	Asia	Latin America	Africa
Buckley, Clegg and Wang (2002)	–	Chinese domestic firms for manufacturing	–
Wang and Li (2004)	Middle area of China	eastern China	Whole China at country level, western China
Bo (2006)	29 provinces in China for 1985-1992	29 provinces in China for 1992-2003	–
Wang and He (2009)	–	China, in the long run	–

Source: author's own summary

Bo (2006) empirically examined the displacement effect of FDI in China using a panel dataset of 29 provinces from 1985 to 2003. He divided his sample into two sub-periods: pre-1992 and post-1992. The empirical results suggest that FDI has a significant crowding in effect on domestic investment in China before 1992 but the effect turned into crowding out afterwards. In particular, the crowding out effect is more significant in the area of Pearl River Delta (east China) where the economy is characterised by export-oriented and labour-incentive industries. Similar study by Wang and He (2009) tested the influence of FDI on Chinese domestic investment between 1983 and 2007

using co-integration analysis and error correction model. They found that in the long run, FDI has a crowding out effect on domestic investment whilst in the short term, FDI has a lagged and negative effect on domestic investment.

7.4. Theoretical Framework and Model Specification

This section will introduce the theory and model used to empirically test the FDI displacement effects in this study.

In economics, crowding out is defined as "any reduction in private consumption or investment that occurs because of an increase in government spending (Blanchard, 2008)". If the increase in government spending is not accompanied by a tax increase, government borrowing to finance the increased government spending would increase interest rates, leading to a reduction in private investment. However, the crowding out effect might be changed by the fact that government spending sometimes expands the market for private-sector products through the multiplier and thus government activities would stimulate or 'crowd in' private fixed investment. This definition could be applied to both FDI and domestic investment. Most pervious empirical studies on FDI displacement effect realise that the effects of FDI on domestic investment may well vary from country to country as the domestic policies, the kinds of FDI that a country receives, and the strength of domestic enterprises are different. And the majority of previous empirical studies are based on regional-level data analyses. There has been limited research into the influences of FDI on domestic investment among different sectors. Therefore, empirical analyses on data across industries appear to be more valuable. This study follows the theoretical model developed by Agosin and Machado (2005) and applies it to the Chinese market. In addition, this study empirically analyses the effect of FDI on domestic investment in China using both regional-level and sector-level data.

To explain FDI displacement phenomenon, it is necessary to start with a simple formulation for total gross investment which is equal to the sum of domestic investment I_d and foreign investment I_f by FIEs.

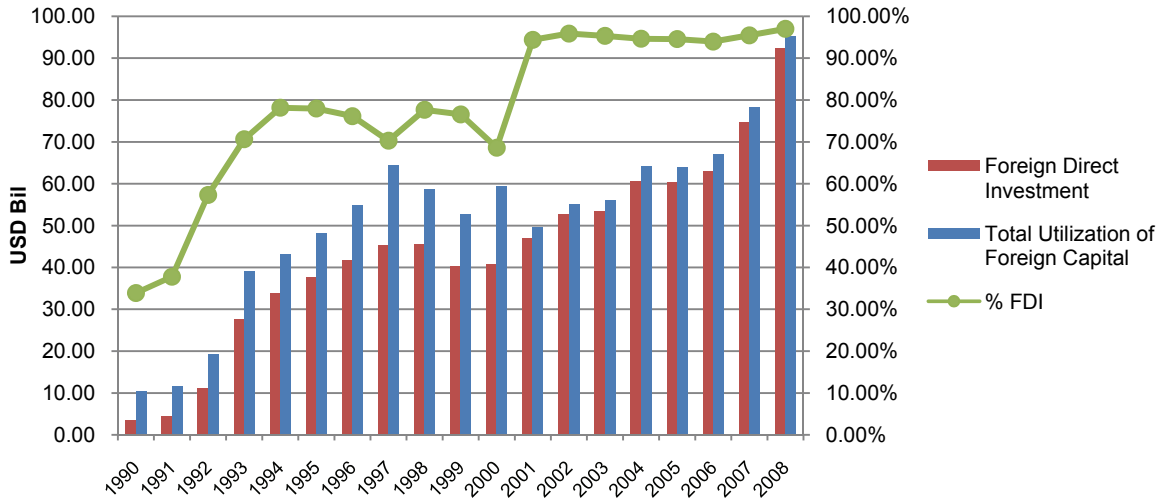
$$I = I_d + I_f \tag{7-1}$$

Conventionally, I_f is assumed to be FDI. However, this is sometimes an over-simplification and may not necessarily be true. According to Agosin and Machado

(2005), FDI is a "financial balance-of-payments concept", a large proportion of which never becomes investment in real sense such as mergers and acquisitions. On the other hand, investment is a "real national accounts variable", which is made in pursuit of favourable future returns. Thus, FDI may be more or less than I_f for different countries. In terms of China's situation, foreign loans were the most important way to utilise foreign capitals for the periods of 1979 to 1989. With the increase of FDI during the 1990s, the amount of FDI inflows has exceeded foreign loans and gradually become the dominating form of foreign investment. Figure 7.1 shows an overview of the utilisation of foreign capital in China from 1990 to 2008. It is shown that FDI only accounts for about 33% of total utilised foreign capital in 1990, and then the proportion has increased rapidly. The proportion of FDI in total foreign capital utilisation reached 80% in the following five years before a small decline around 2000 and then rose sharply in 2001. Particularly in recent years (years after 2001), the proportion of FDI has maintained at the level of more than 95%. Therefore, it is reasonable to assume that the amount of FDI is a proxy for foreign investment by FIEs (I_f).

Figure 7.1

Overview of utilisation of foreign capitals in China



Source: Statistic Yearbook of China, 1990 – 2008.

The primary objective of this chapter is to evaluate the influences of FDI on investment by domestic firms (I_d). If a unit of increase of FDI result in the same amount of increase in total investment (I), it indicates that FDI does not have any effect on domestic investment at all. If FDI inflows increase by a larger amount than the increase of total

investment, it means that FDI should have a crowding out effect on domestic investment. Of course there is one last possibility that if the increase of FDI inflows leads to an even greater increase in total investment, this is a clear indication of FDI crowding in domestic investment.

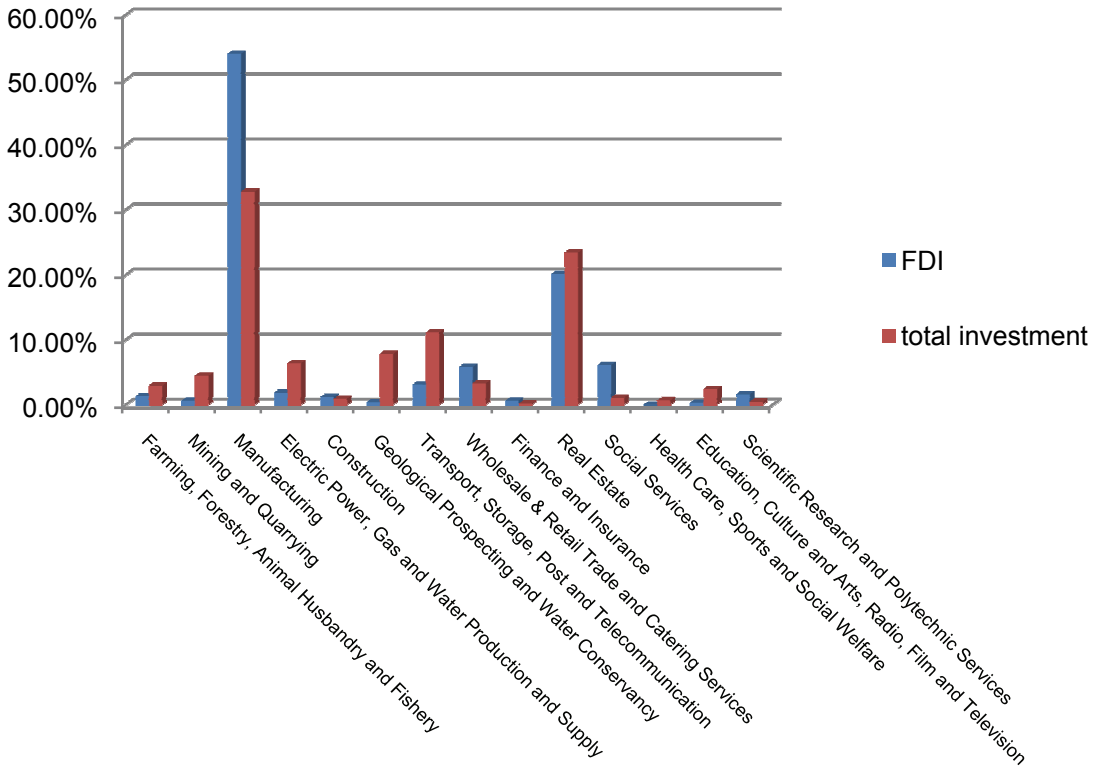
However, the effect of FDI on domestic investment may vary significantly for countries and areas with different situations. Therefore, it is a key research question to specify the conditions that are in favour of crowding in or crowding out effect. Most previous literature (e.g. Romer's, 1993; Agosin and Machado, 2005) suggests that for developing countries the effect of FDI is closely linked to the sectoral distribution of foreign investment in relation to the distribution of existing domestic production. When FIEs invest in a completely new or undeveloped sector in the host country or area, FDI is more likely to have a positive effect on domestic capital market because FDI enters the domestic market by introducing new goods, services, knowledge, and activities domestic investor often do not possess or have the necessary resource to undertake. Moreover, foreign investors do not need to compete with existing domestic investors or displace them while bringing in new technology and management for the domestic market. In this case, FDI is more likely to have a crowding in effect on domestic investment or in another word, *complement* for domestic investment. On the contrary, if FIEs choose to invest in existing or even mature sectors, they may occupy the limited resources in the host country or utilise their technological and financial advantages to compete with (usually financially and technically disadvantageous) domestic investors. As a result, it is probable that large FDI inflows will lead to intensive competition and even cause domestic firms' bankruptcy rather than inducing domestic firms to invest. In this case, FDI inflows are more likely to have crowding out influences on domestic investment, i.e. *substitute* for domestic investment. To summarise, when the distribution of FDI in a country is different from its existing capital stock of production distribution, it is more likely to have a crowding in impact on the domestic market, otherwise it is more likely to be crowding out domestic investment.

Figure 7.2 shows the distribution patterns by sector for FDI and total investment in China. From this figure, it can be seen that more than 30 per cent of the total investment in China are concentrated in the manufacturing sector and the second largest funding recipient sector is real estate. The patterns of FDI and total investment are very similar on those two sectors however the situation is not necessarily the same for other sectors. A two tailed t-test is used to determine if there is a difference between those two samples. The null hypothesis that

the mean difference between FDI and total investment being the same cannot be rejected (p value = 0.975) which indicates that the sectoral distributions of FDI and total investment in China are very similar to each other. Based on the theoretical framework discussed above, the main hypothesis of this chapter is that *foreign direct investment in China is expected to have a crowding out effect on Chinese domestic investment*[71].

Figure 7.2

Sector distribution of FDI and total investment in China



Source: China Statistic Yearbook (2008)

In order to empirically test the displacement effect of FDI in China, this study employs the model developed by Agosin and Machado (2005) using both regional-level and sector-level data.

We have already discussed in Equation (7-1) that total investment (I) is assumed to be the sum of domestic investment (I_d) and real investment by foreign invested firms (I_f), where FDI is usually thought to be a valid proxy for I_f. However, this assumption is an

[71] This hypothesis is very rough, as the sectoral distribution of FDI and total investment changes over year.

over-simplification in the sense that FDI may not become real investment at once. So alternatively, one could express I_f as a function of FDI (F) to solve this problem, where I_f is not only reflected by current FDI values (F_t) but also related to its lagged values (F_{t-1}, F_{t-2}), as shown in the following equation:

$$I_{f,t} = \varphi_0 F_t + \varphi_1 F_{t-1} + \varphi_2 F_{t-2} \tag{7-2}$$

On the other hand, Agosin and Machado (2005) also specified domestic investment in a developing country. They believed that domestic investment is closely related to the difference between the desired and actual capital stock by domestic firms, as expressed by the following capital adjustment model:

$$I_{d,t} = \lambda (K^*_{d,t} - K_{d,t}) \tag{7-3}$$

where K_d^* represents the capital stock desired by domestic firms and K_d the actual capital stock of domestic firms. λ can be seen as an 'adjustment coefficient' and is assumed to be greater than 1.

In this basic model, the desired level of capital stock is determinate by expected growth (G^e) and the difference between actual output and full-capacity output (y), which is derived from the neoclassical investment model (Hall & Jorgensen, 1967). So ignoring any effect of the user cost of capital such as interest rates[72], the desired level of capital stock can be modelled as:

$$K^*_{d,t} = \phi_0 + \phi_1 G^e_t + \phi_2 y_t \tag{7-4}$$

where ϕ_1 and $\phi_2 > 0$. The actual level of capital stock can be expressed as beginning-of-year capital stock plus new investment minus depreciation:

$$K_{d,t} = (1-d)K_{d,t-1} + I_{d,t-1} \tag{7-5}$$

Where d is the annual depreciation rate. Combining equation (7-3) to (7-5), we have the following equation for total domestic investment:

$$I_{d,t} = \phi_0' + \phi_1' G^e + \phi_2' y + \lambda I_{t,t-1} + \lambda' I_{d,t-2} \tag{7-6}$$

[72] As argued in Agosin and Machado (2005), most empirical studies for developing countries do not find the user cost of capital an important determinant of domestic investment.

where $\phi_o^{'} = \phi_o + \lambda^2(1-d)^2 K_{d,t-2}$

$\phi_1^{'} = \lambda\phi_1$

$\phi_2^{'} = \lambda\phi_2$

$\lambda^{'} = \lambda^2(1\text{-}d)$

Now, substituting equation (7-6) and (7-2) into the total investment equation (1), the final regression model can be obtained:

$$I_t = \phi_{'0}^{'} + \phi_1^{'} G_t^e + \phi_2^{'} y_t + \varphi_0 F_t + \varphi_1^{'} F_{t-1} + \varphi_2^{'} F_{t-1} + \lambda I_{t-1} + \lambda_{t-2}^{'} \qquad (7\text{-}7)$$

where $\psi_1^{'} = \psi_1 - \lambda$

$\psi_{2'} = [\psi_2 - \lambda^2(1-d)]$

$G^e_t = \eta_1 G_{t-1} + \eta_2 G_{t-2},$

and u_t is a white noise.

7.5. Sample and Data Descriptives

In chapters 5 and 6, I analysed FDI regional and sector distribution determinants using regional-level and sector-level data in China, respectively. Here, we also use those two different dataset (regional-level and sector-level) to estimate the FDI displacement effect in China. Thus, the data employed in this study are: first, a panel data of 300 major cities in China from 34 provinces over the period 1991-2008 from *Urban Statistic Yearbook of China* and second, a panel data for 14 sectors for the period 1996-2008[73] from *Statistic Yearbook of China* and *China Economics Information and Statistics Database*. Almost all the previous studies on the effect of FDI on domestic investment use regional-level datasets in their empirical tests, and there is very limited analysis based on sector-level data. Thus, one of the most important contributions of this study is to conduct a sector-level analysis for the FDI displacement effect.

The specification for both regional and sectoral analyses is based on Equation (7-7) as follows:

$$I_{i,t} = \alpha + \beta_1 F_{i,t} + \beta_2 F_{i,t-1} + \beta_3 F_{i,t-2} + \beta_4 I_{i,t-1} + \beta_5 I_{i,t-2} + \beta_6 G_{i,t-1} + \beta_7 G_{i,t-2} + \varepsilon_{i,t} \qquad (7\text{-}8)$$

[73] 1996 was chosen as the starting year because there is no sectoral-level data for total investment before 1996 in China.

where I is the total investment/output ratio, F is the FDI/output ratio, G is the growth rate of output, α is a constant and ε is a random error. All variables in the analysis are normalized to the 1991 price level. Since the amount of total investment is highly incomplete in China, previous studies on China's investment usually use total investment in fixed asset as a proxy for total investment (e.g. Wang and He, 2009) as investment in fixed asset accounts for more than 90% of total investment for China[74]. This study also adopts this approach.

Table 7.2 reports the descriptive statistics for the data used in this study on both regional- and sector-levels. The detailed break-down of FDI in different regions and sectors can be found in Chapter 5 and 6, respectively. Here only figures of direct relevance to this chapter are reported. Panel A of Table 7.2 presents the descriptive statistics for the regional analysis of FDI displacement effect, which covers 300 cities in China from 34 provinces. FDI and total investment are scaled by the individual city's contribution to the year-end gross domestic product (GDP) of China. For all 300 cities, on average FDI accounts for 4.3% of total output whilst total investment constitutes 40% of total output, thus domestic investment is still the primary source of capital in China. The average annual growth rate of output is around 10.6%. When dividing the cities into three different geographic regions (east, middle and west), cities in the eastern area tend to have the highest FDI to output ratio (7%) while the figure for cities in west China is the lowest (1.4%). This reflects foreign investors' preference over more economically advanced area—the eastern area—in China, which also has the highest average output growth rate (11%). Note that the total investment to output ratio is the lowest in the eastern cities, which could imply that the production is more 'efficient' in this area in terms of output per unit of investment. It can be seen that the number of cities from west China is much lower than the other two areas. This is both a result of the geographic distribution of major cities in China, as well as the relative under-development of the area.

Panel B of Table 7.2 reports the descriptive statistics for fourteen major industrial sectors in China as a whole, as well as for three industry classifications (primary, second and tertiary, which are defined in detail in Chapter 6). The scaling variable used

[74] Number obtained the author's own calculation based on data from Statistic Yearbook of China when the data is available.

is the year-end total output for each sector disclosed by the annual Statistic Yearbook of China. The value of FDI - total output ratio as well as the average annual output growth for the whole China is reasonably close to the figures derived from regional data. However the total investment to output ratio is significantly higher and on investigating the break-down of the data by industrial classifications, it is found that the higher ratio is mainly caused by the tertiary, or service industry. In particular, Geological Prospecting and Water Conservancy, and Real Estate have the highest percentage of total investment to output (900% and 300%, respectively)[75]. Note that FDI contributed the most to output for the tertiary industry (4.4%) and this industry also has the highest output growth rate (13.2%). The primary industry, or the agriculture sector, has the lowest FDI to output ratio (0.4%). The distribution of FDI among sectors and industrial classifications is broadly consistent with the pattern observed in Chapter 6.

[75] Removing these two sectors will reduce the investment/output ratio to 0.35 but will further reduce the already small sample size.

Table 7.2

Descriptive statistics

This table represents the data description for all variables tested in this study including regional-level and sector-level data. It describes the value of mean, standard deviation, median for each variable.

Panel A: Regional Statistics

	Overall			East China			Middle China			West China		
	Mean	Std dev	Median	Mean	Std dev	Median	Mean	Std dev	Median	Mean	Std dev	Median
FDI/Output	0.043	0.069	0.021	0.069	0.089	0.041	0.024	0.024	0.016	0.014	0.036	0.005
Total investment/Output	0.397	0.421	0.349	0.377	0.214	0.349	0.415	0.606	0.338	0.414	0.318	0.370
Output Growth	0.106	0.132	0.110	0.109	0.138	0.114	0.103	0.141	0.107	0.106	0.084	0.108
No. Observations		3463			1605			1321			537	

Panel B: Sectoral Statistics

	Overall			Primary Industry			Second Industry			Tertiary Industry		
	Mean	Std dev	Median	Mean	Std dev	Median	Mean	Std dev	Median	Mean	Std dev	Median
FDI/Output	0.036	0.064	0.012	0.004	0.001	0.004	0.031	0.030	0.015	0.044	0.082	0.012
Total investment/Output	0.940	1.916	0.254	0.092	0.018	0.091	0.392	0.293	0.307	1.439	2.471	0.323
Output Growth	0.109	0.151	0.098	0.053	0.054	0.039	0.088	0.173	0.107	0.132	0.143	0.098
No. Observations		122			11			44			67	

Source: author's own calculation.

7.6. Analytical Approach and Empirical Results

As suggested in the literature review section, empirical evidence regarding FDI displacement effects varies significantly both internationally and within the Chinese market. The variation of empirical evidence is partly a result of different research methodologies and data employed in different studies, as well as the theoretical framework that the hypothetical relationship between FDI inflows and domestic capitals is based on. These inconsistent results suggest that it will not be surprising that the effects of FDI in China are unequal amongst different regions or sectors, or even in different periods of development in China's economy. This is not necessarily an indication that different results are conflicting with each other but rather that FDI displacement effect is a complex and multidimensional issue which needs to be investigated using different data and in multiple levels. Moreover, the fact that the effect of FDI changes overtime may be an insightful indication of whether or not foreign investment have had positive influences on the recipient country's economy in long term. This empirical analysis section will first report the results of FDI displacement on both regional level and sector level, and then try to reconcile the empirical evidence from this two-layer analysis.

Equation (7-8) is the primary empirical specification for both regional- and sector-level analyses. As lagged dependent variables enter the right-hand-side of the equation, dynamic panel data model is the appropriate econometric model that takes into account the persistence of the dependent variable and instrumental variables are used to solve the endogeneity problem within explanatory variables (the detail of dynamic panel data mode is discussed in the Chapters 4 and 6). In this chapter, the robust two-step GMM model by Blundell and Bond (1998) is used[76]. However, as robustness checks, we apply static panel data models to all the regressions and this does not alter the main empirical findings from the dynamic model.

Table 7.3 shows the estimated results using regional data in China. Specification (1) reports the results for all sample cities and specifications (2) to (4) for cities in the eastern, western and middle areas of China, respectively. Further, in order to explore the

[76] The choice of two-step GMM model over one-step model is purely based on sargan test statistics for overidentification, where the test is only past in two-step specifications. Arellano and Bond (1991) and Blundell et al (2000) show that in large sample analysis, the one-step Sargan test tends to over-reject using GMM estimators whilst two-step tends to under-reject, however this is not the main issue of this study.

influence of tax incentives on the displacement effect of FDI, specifications (5) and (6) shows the coefficient estimates for cities with and without tax concessions, respectively. For all specifications the Sargan test of over-identifying restrictions cannot be rejected, which guarantees the validity of the instrumental variables. The GMM method also requires that there is no evidence of second-order serial correlation (AR(2) statistics in the table) in the first-differenced residuals, which is also the case for all specifications. It can be found that there is persistence in total investment at the second order for China as a whole, but the persistence is only found in east and west China. The annual growth rate of output has a significantly positive effect in predicting total investment in China as well as for eastern cities. The amount of FDI and its lagged values do not have any significant effect on total investment for China, and neither for eastern, western and middle regions separately. Note that all variables have no explanatory power for the sub-sample of east China. This is possibly a result of the under-development and thus the lack of a systematic industrial or production structure in the area, where the main driver of capital injection is not economic growth, but more exogenous variables such as public financing.

The main objective of this study is to empirically test the relationship between FDI and total investment in the long term. Here the relevant coefficient for the LR effect of FDI can be derived from Equation (7-8) as:

$$\beta_{LR} = \frac{\sum_{i=1}^{3} \beta_i}{1 - \sum_{i=4}^{5} \beta_i} \tag{7-9}$$

The value and significance of coefficient β_{LR} will determine whether the effect of FDI on domestic investment is a crowding in or crowding out. Specifically, there are three possible results:

1) if $\beta_{LR} = 1$, it means that in the long term, one unit of inflows of FDI will increase total investment by the same amount, which indicates FDI has no effect on domestic investment;

2) if $\beta_{LR} > 1$, it means that in the long run, one unit of FDI inflows will lead to more than one unit's increase in total investment, i.e. FDI inflow has a positive (crowding in) effect on domestic investment;

3) if $\beta_{LR} < 1$, it means that in the long run, one unit of FDI inflows will lead to less than one unit's increase (or even negative change) in total investment, i.e. FDI has a negative (crowding out) effect on domestic investment.

Table 7.3

Dynamic panel data regression: regional level data analysis

This table reports the results from two-step GMM estimations on Equation (7-8) (Blundell and Bond, 1998) in a fixed effect panel data model using data on 300 cities between 1990 and 2008. AR(1) and AR(2) are tests of first and second order serial auto-correlation in the first-differenced residuals, asymptotically distributed N(0,1). Sargan is a χ^2 test of overidentifying restrictions. Asymptotic robust standard errors are reported in parenthesis. *, **, ***stand for 10%, 5% and 1% significance levels, respectively.

	(1)	(2)	(3)	(4)
Specifications	**All China**	**East China**	**West China**	**Middle China**
Investment (t-1)	0.409	0.548***	0.561	0.345*
	(0.265)	(0.132)	(0.454)	(0.187)
Investment (t-2)	0.404*	-0.033	-0.111	0.361*
	(0.241)	(0.112)	(0.634)	(0.213)
FDI	0.117	0.107	1.062	0.740
	(0.121)	(0.200)	(5.070)	(0.934)
FDI (t-1)	-0.102	-0.184	0.170	0.323
	(0.097)	(0.149)	(3.133)	(0.683)
FDI (t-2)	0.045	0.075	-0.053	0.090
	(0.076)	(0.188)	(1.519)	(0.598)
Output growth (t-1)	0.105	0.140*	0.003	-0.044
	(0.070)	(0.077)	(0.178)	(0.101)
Output growth (t-2)	0.088**	0.068	-0.004	-0.103
	(0.034)	(0.078)	(0.180)	(0.088)
Year Effects	Yes	Yes	Yes	Yes
AR(1) (*p-value*)	0.151	0.006	0.384	0.028
AR(2) (*p-value*)	0.378	0.690	0.698	0.849
Sargan (*p-value*)	0.101	0.999	1.000	1.000
Number of obs.	2760	1348	352	1066
Number of cities	258	112	48	98

Table 7.4 reports the values and significance levels of the long-term coefficient for FDI's effect on domestic investment. On country level, FDI has a significant crowding out effect on domestic investment as the long-term coefficient is 0.32 which is smaller than 1. This means that one dollar of foreign investment in China will reduce (crowd out) domestic investment by 0.68 (i.e. 1 – 0.32) dollar. For different areas in China, FDI has a negative (crowding out) impact on domestic investment in the eastern area of China with long-term coefficient of -0.004. A negative coefficient means that one unit of foreign investment has not only substituted one unit of domestic investment, but this substitution effect is so distinct that it actually reduces the total amount of investment in the area. The result for cities in Middle China is opposite to the eastern area. Here FDI has a significantly positive (crowding in) effect on domestic investment with a long term coefficient 3.92. And there is no explicit effect of FDI on domestic investment in west China. The absence of a significant long-term effect of FDI in west China is likely to be caused by the large standard errors of the coefficient estimates (and the resulting large confidence interval of β_{LR}). However it could also be the result of the lack of foreign investment in the area, as observed in the descriptive statistics. To sum up, the findings are generally in line with the theory that FDI is more likely to displace domestic investment in economic advanced areas, where the industrial structure is more mature and production approaching its full capacity. Regarding the effect of tax incentives on possible displacement effects of FDI, it is found that FDI has a significant crowding-out effect on cities with tax concessions (long-term coefficient = 0.23) whilst there is no significant effect for cities without tax concessions. This suggests that tax incentives have increased the competitive advantage of FIEs to a large extend and domestic enterprises are forced out of the local market because of the high tax bills compared to their foreign counterparts.

In order to compare the FDI displacement effects in different periods, we also calculated β_{LR} for two sub–periods, namely 1990 to 2000 and 2001 to 2008 to see if there are any differences between them since China's economic development and the features of domestic firms may have changed dramatically in those two periods. The results from this comparison show explicit signs of improvement regarding the effectiveness of FDI on domestic market. In the pre-2001 period, the results are very similar to the whole sample period (1990-2008) results except for the middle area, where FDI appears to have no effect on domestic investment. In this period, the effect of FDI is either substituting domestic investment or making no contribution to the capital accumulation of the domestic market. On the other hand, over the second half of the sample period,

the effect of FDI has generally become more positive or, 'less' negative. The coefficient shows that FDI has stopped displacing domestic investment in China (insignificant β_{LR}). Although FDI is still crowding out domestic investment in eastern cities, there is a less severe displacement effect in the sense that the long-term coefficient becomes positive rather than negative. In addition, FDI inflows tend to have a crowding in effect on domestic investment for the middle area during this period. The result for the western area does not change, where FDI still has no effect. This could imply that the lack of foreign investment is still an issue in west China even in recent years, compared to the rest of the country.

Table 7.4

Regional level analysis: Long-term effects of FDI on domestic investment

This table reports the values and the implication of the long-term coefficient for FDI's effect on total investment based on equation (9) and using coefficient estimates from Table 7.3. *, **, ***stand for 10%, 5% and 1% significance levels from the non-liner test statistics, respectively.

Region	Long term coefficient (β_{LR})	FDI effect
1990-2008		
China	0.322	Crowding out **
East area	-0.004	Crowding out ***
West area	2.143	No effect
Middle area	3.923	Crowding in ***
With concessionary tax	0.225	Crowding out***
No concessionary tax	0.710	No effect
1990-2000		
China	0.314	Crowding out ***
East area	-0.003	Crowding out ***
West area	-0.592	No effect
Middle area	5.064	No effect
2001-2008		
China	0.668	No effect
East area	0.229	Crowding out ***
West area	1.233	No effect
Middle area	1.956	Crowding in ***

The different (and improved) effects of FDI on domestic investment may indicate that China's economy and domestic firms have gradually adopted the large amount of FDI inflows. After experiencing a long period of adaption, Chinese domestic firms could have gradually gained the abilities to face the strong competition from multi-national enterprises. On the other hand, this can be seen as a result of the Chinese Government's greater emphasis of advanced techniques and management when introducing foreign

investment, rather than decisions making purely based on financing needs. In particular, this study also tries to add region dummy variables as control variables into the regressions, and the results are not different from the existing findings[77].

Tables 7.5 and 7.6 report the coefficient estimates and the resulting long-term FDI effect coefficients using sector-level data from 1996 to 2008. This study also runs separate regressions for the second and tertiary industry to examine whether or not the effect of FDI varies across industries. The results show that almost all variables and their lag values are significantly related to total investment for all industries and second/tertiary industry individually. There is strong evidence of investment persistence at both first and second lags for all three specifications. Output growth is also significantly associated with total investment. A 1% increase in the growth rate leads to 0.4% increase in total investment for all sample sectors and the increases are slightly lower at 0.2% and 0.3% for second and tertiary industry, respectively.

Note that the magnitude of coefficient estimates for FDI (and its lagged values) are considerably larger compared to regional level analysis, although the long-term effect (the sum of coefficient estimates on FDI) is much lower and approaching unity. This is possibly caused by the imbalanced distribution of FDI in different sectors and the difficulty in calculating the contribution of certain sectors to the total GDP value. On further investigation of the results for different industrial classifications, these 'abnormal' coefficient estimates (the large value of coefficients for FDI variables) are mainly attributed to the tertiary industry. Particularly, as observed in the data descriptive section, the contribution of FDI to total investment is extremely low for two sectors, namely Geological Prospecting and Water Conservancy, and Real Estate. This is believed to have 'magnified' the effect of FDI on total investment. In order to test this conjecture, the above two sectors are removed from the regressions. This approach has significantly reduced the magnitude of the coefficient estimates for FDI and estimates for remaining variables stay virtually the same[78]. However, at the same time this has reduced the already small sample size and resulted in added noise (larger standard errors) for the regressions.

[77] Results not reported.
[78] Results not reported but are available upon request.

Table 7.5

Dynamic panel data regression: sectoral level data analysis

This table reports the results from two-step GMM estimations on Equation (7-8) (Blundell and Bond, 1998) in a fixed effect panel data model using data on 14 industrial sectors between 1996 and 2008. AR(1) and AR(2) are tests of first and second order serial auto-correlation in the first-differenced residuals, asymptotically distributed N(0,1). Sargan is a χ^2 test of overidentifying restrictions. Asymptotic robust standard errors are reported in parenthesis. *, **, ***stand for 10%, 5% and 1% significance levels respectively.

Specifications	(1) Whole samples	(2) Second industry	(3) Tertiary Industry
Investment (t-1)	0.948***	1.458***	0.971***
	(0.109)	(0.064)	(0.081)
Investment (t-2)	0.089*	-0.554***	0.095**
	(0.051)	(0.060)	(0.042)
Output (t-1)	0.379**	0.230***	0.327**
	(0.173)	(0.015)	(0.145)
FDI	23.405***	-3.903***	23.998***
	(1.556)	(1.350)	(2.093)
FDI (t-1)	-16.365***	3.685***	-15.889***
	(2.571)	(0.821)	(2.220)
FDI (t-2)	-1.393	-1.601***	-2.351***
	(1.241)	(0.245)	(0.559)
Output (t-2)	0.245	0.032	0.706***
	(0.212)	(0.062)	(0.263)
Year Effects	Yes	Yes	Yes
Instruments			
AR(1) (*p-value*)	0.111	0.102	0.107
AR(2) (*p-value*)	0.260	0.618	0.268
Sargan (*p-value*)	0.098	0.443	0.856
number of obs.	94	36	49
number of groups	14	4	9

The examination of the long-term FDI effect coefficient does not indicate any significant crowding in or out effect for the whole sample (all 14 sectors), and for second and tertiary industry either, although the negative value of the LR coefficients for all three cases may indicate a possible crowding out effect. The results hold even after removing the two 'outlier' sectors. Therefore, the sector-level analysis for China at national level suggests that FDI inflows have no effect on domestic investment. This result is different form regional analysis due to the different levels of analysis they are based on. In summary, empirical evidence shows that FDI inflows have larger influences on domestic investment on regional levels than sector levels. The large

standard errors from sector-level analyses may not only be a result of the small sample size, but more importantly, may be an indication of the strongly imbalanced distribution of investment and production activities in different areas of China.

Table 7.6

Sectoral level analysis: Long-term effects of FDI on domestic investment

This table reports the values and the implication of the long-term coefficient for FDI's effect on total investment based on equation (9) and using coefficient estimates from Table 7.5 for all sectors, second and tertiary industries, respectively.

Sectors	**Long term coefficient (β_{LR})**	**FDI effect**
1996-2008		
14 main sectors	-1.480	No effect
Second industry	-1.885	No effect
Tertiary industry	-0.867	No effect

7.7. Conclusions

This study empirically investigates the displacement effect of FDI on domestic investment in China from both regional and sectoral perspectives using the econometric framework developed by Agosin and Mayer (2005). The regression results suggest that FDI inflows in China have a more significant impact on Chinese domestic investment for specific areas than specific sectors. For regional analysis, FDI has a significant crowding out effect on domestic investment for the whole country and the eastern area, whereas a crowding in effect is found in mid China for the period of 1990-2008. This result has slightly changed when the estimation sample period is divided into 1990-2000 and 2001-2008 sub-periods. For the period before 2001, all results remain the same except for the impacts of FDI in mid China. However, the situation has changed between 2001 and 2008, when there is an observed crowding in effect in mid China whilst FDI nation-wide stops crowding out domestic investment. In addition, for west China, FDI is found to have no significant effect on domestic investment for any time periods. Regarding the possible effect of tax on FDI displacement effects, it is found that domestic investment in cities with tax concessions has been crowded out by FDI but no crowding-out effect is found in cities without tax concessions. With respect to

sector-level analysis, empirical estimations in this study do not find any significant displacement effect of FDI on domestic investment both on country level and for each individual industry.

There are two possible implications from this study. Firstly, cities in west China receive much less FDI than cities in the eastern and middle areas as western cities have lagged significantly in opening to overseas investment. Thus, it is reasonable to expect that FDI has no effect on domestic investment in the western area or a much lower effect than the other two regions in China. Secondly, the sample cities in the western area are fewer than the middle and eastern areas[79] (the selection criteria of sample cities are discussed in Chapter 4). As a result, the lack of any statistically significant results could be due to the low availability of relevant data. Moreover, results from multi-period analysis show that the effect of FDI on domestic investment becomes more favourable in recently years. It may indicate that China's economy and domestic firms have gradually adopted the advanced technology and management brought along with FDI inflows. Domestic enterprises have demonstrated a promising learning curve to compete more effectively, and more importantly successfully, with their foreign counterparts, which is a long-term benefit FDI has brought to China's economy.

[79] The sample cities selected for this study are all capital cities and prefecture-level cities in China (which means they are all big cities in China). The distribution of those cities is strongly biased towards the eastern and middle areas.

CHAPTER 8
Conclusion

Since China's adoption of the 'opening-up' policy at the launch of the economic reform in 1978, China has received a grand total of USD854 billion in FDI from 1979 to 2008 and benefited tremendously from both tangible and intangible assets associated with FDI inflows. With large amount of FDI inflowing into the Chinese market, China's economic has been growing at an average rate of 9.5% for more than 20 years. Few countries in the modern history of economic development has benefited from FDI as much as China. There is an extensive body of academic studies on the Chinese economy over the last three decades to explore the characteristics and effects of FDI in China (e.g., Chen, 1996; Head and Ries, 1996; Zhao and Zhu, 2000).

As noted from the introductory chapter, this thesis investigates the determinants of FDI distributions in China and evaluates the effects of FDI on Chinese domestic investment. It consists of a review of China's economy and the development of FDI (Chapter 2), a comprehensive literature survey for previous studies on FDI (Chapter 3), a detailed discussion of research methodologies for this study (Chapter 4) and three independent research chapters (Chapters 5, 6 and 7) empirically investigating the research questions specified by the aims and objectives of this thesis. This study provides some valuable insights into foreign investors' decision making and the economic costs/benefits of FDI, which have important implications for scholars, practitioners and policy makers alike. In this conclusion section, I will first go through the empirical findings from the three research chapters, and then proceed to a broader discussion on the key contributions and implications of this study. Finally, this chapter will discuss the limitations of this study and recommend possible future research topics that could be extended from this study.

8.1. Research Findings

This study undertakes a comprehensive analysis on FDI regional and sectoral distributions in China and the possible displacement effect of FDI on Chinese domestic investment. The key findings in this thesis can be summarised into the following four points. First, at regional level, foreign investors' investment decisions are influenced by

tax rates as well as other external factors such as geographic locations, labour costs, market size and infrastructure with FDI heavily biased towards the eastern area of China. Second, at sector level, foreign investors are affected market size, employment, wage rate, exchange rate and state ownership degree, but not by the level of openness degree. Third, FDI has a significant crowding out effect on domestic investment in China especially the eastern area, whereas a crowding in effect is observed in the middle area and no effects for the western area. Fourth, it appears that FDI neither crowd in nor crowd out domestic investment from a sector level analysis.

The first research objective is to investigate what factors will significantly affect FDI location choice decisions in China. Chapter 5 aims to answer this question using a sample of 300 cities in China from 1990 to 2008. This chapter follows the previous study of Tung and Cho (2001) but uses a much more comprehensive dataset both covering more cities/variables and over a longer period. Factors considered in this study not only include some commonly identified explanatory variables such as tax, labour costs and market size but also some unique variables like geographic locations. The results from both cross-sectional and time-series analyses suggest that tax incentives, region, labour costs and market size are all very crucial variables that affect FDI location decisions in China. As expected, tax benefits are positively related to FDI while cities located in the eastern and middle parts of China attract more FDI inflows than those located in the western area. Moreover, certain infrastructure variables such as electricity and water supply are also proved to have significant impacts on FDI location choice. When comparing the magnitude of tax impact on FDI across regions, it is found that tax incentive policies have a larger effect on FDI inflows in the eastern than the western part of China.

The second objective is to examine the factors that determine FDI sector investment choice in the Chinese market. This question is investigated in Chapter 6 using the FDI data on 14 major sectors over the period of 1990 – 2008. Before this study, there is very limited empirical research on the sector distribution of FDI especially in China. This study uses the most comprehensive dataset in China so far and alternative methodologies to test the determinants of FDI sector choice. Explanatory variables used in the multivariate regression models include market size, employment, wage rate, exchange rate, state ownership degree and openness degree. Consistent with the predictions by the main hypotheses, FDI is positively related to the market size

negatively associated with the state ownership degree of the sector. And FDI also affected by other factors such as Labour costs, employment and exchange rate. These results imply that rapid economic growth, potential large market, rich labour resources and low labour costs are the main motivations of foreign investment in a certain sector. More importantly, it is shown that the common determinants of FDI such as market size and labour costs are most important considerations when investing in the second industry, whilst the extent of economic reform and market liberalisation, proxied by state ownership degree and openness degree, have a larger influence on the third, or service industry.

Chapter 7 looks at the final research objective of this thesis, to test whether or not the increasing FDI inflows have any displacement effects (crowding in or crowding out) on Chinese domestic investment. There is no doubt that FDI has contributed significantly to the economic development in China. However, it remains unclear if the inflow of foreign capital has led to an increase of total capital invested in China. This chapter aims to fill this knowledge gap from both regional and sectoral perspectives. The regional analysis suggests that FDI does have a crowding out effect in whole China especially the eastern area. It also shows that FDI has a crowding in effect in the middle area of China but no effect in west China. Never the less, this study does not find any significant relationship between FDI and domestic investment on sector level.

8.2. Key contributions

This thesis undertakes a detailed and systematic review and investigation of foreign direct investment in China. It has empirically examined the causal link between FDI, economic environment, external factors and domestic investment. The thesis contributes to the current literature by applying state of the art empirical methodologies to up to date data covering both regional- and sector-level information. In particular, compared to previous studies, this study extends the existing literature in the following ways.

The first contribution is the use of more recent data and more advanced and statistically robust empirical methodologies. Previous empirical studies on FDI especially in China usually use ordinary least squares (OLS) as the main estimation models. However, this approach ignores nature of typical economic data sets, which consist of both spatial and temporal dimensions. In this thesis, all three empirical chapters use panel data models to take the time-series nature of the data into consideration. Panel data models not only

yield more precise and robust estimates, but more importantly, also allow us to investigate the distributions and influences of FDI in different stages of economic development, may it be the introduction of a new legislation by the Chinese Government or a specific phase of the global market. The empirical evidence from this study can thus provide practitioners and policy makers with more precise and far-reaching implications.

Second, this study adopts a comprehensive 'general equilibrium analysis' methodology for FDI in China. Many previous studies for the Chinese market only consider some partial equilibrium specifications in FDI location choice. For example, Tung and Cho (2001) failed to consider the geographic factor. Ali and Guo (2005) ignored tax effects on FDI decisions. It is widely believed that certain factors (tax, exchange rates, etc.) will affect the location choice of foreign investors. However, the interactions between the determinants (such as tax and regional variables, tax and labour costs) are seldom considered in China. This general equilibrium methodology has been applied to the examinations of FDI in China for different sectors and from different regions in this thesis.

Third, this thesis is among the first to conduct a sector-level analysis in China. Whilst most studies in China are concerned with the total volume of FDI, there is limited research so far on the decision making of foreign investors other than location choice. Sector choice decision is an important topic for FDI and the sectoral distribution of FDI is likely to have a direct effect on the industry structure and economy balance of the host country. Thus it would be necessary to investigate what factors influence investors' decisions to invest in certain sector(s). As one of the few first studies to empirically examine the determinants and dynamics of FDI sectoral distributions in China, the evidence revealed regarding the different focus by foreign investors when investing in different sectors has significant implications for future academic research and policy making.

Last but not least, this study has innovatively investigated the possible displacement effect of FDI on domestic investment in China from both regional and industrial perspectives. Presently, evidence on the displacement effect of FDI in China is fairly limited especially with control for industry specific effects, and many aspects of the research question are still left unaddressed for various reasons. However, with more and

more FDI inflows into China, FDI has become an active part of the Chinese economy. The impacts of FDI are related to every aspect of China's economy, including regional domestic enterprises, industrial structure and so on. In addition, the Chinese Government has introduced a number of policies in favour of foreign investors (e.g., the double tax system) over the past thirty years, which are believed to be a direct cause for the rapid development of FDI. Yet it still remains unanswered whether or not the huge amount of FDI inflows and the incentive policies are justifiable especially regarding their effects on domestic investment. Again, this study tries to fill this research gap by empirically testing the displacement effect of FDI in China by region (city specific) and by industry. The empirical findings suggest some important, but formerly unconsidered, differences between the effects of FDI on sector- and regional-levels.

8.3. Policy Implications

The results of this study give rise to some important policy implications for the Chinese Government and also some specific directions for future policy which can be summarised as the follows:

Firstly, although tax incentive policies have been implemented in China for over 20 years, they have much lower influences in the western area than eastern area according to our empirical analysis in Chapter 5. Given the negative geographic location effects of FDI in the western cities, the Government should continue to encourage foreign investment in the western cities using tax concessions, but reduce or remove the tax benefits for foreign investors in the eastern cities.

Secondly, according to our sector analysis in Chapter 6, the effects of market size and labour costs are larger in the second (manufacturing) than third (service) industry, whilst higher state ownership degree and openness degree constitute the major barrier for foreign investors in the tertiary industry. The implication for policy makers from these findings is that the Government should have different emphasis when promoting FDI in different sectors. For example, in order to attract foreign investment in the service industry, government policy should encourage further market liberalisation. On the other hand, an effective policy on FDI in the second industry should focus on improving production efficiency so as to reduce labour costs and increase the market size.

Thirdly, owing to the different displacement effects in different areas in China, the Government should again introduce different policies to different areas. This 'echoes' the first implication but has a wider coverage of policies. More specifically, our findings to some extent undermine the rationale of the new tax policy (introduced in 2008) that replaced the dual tax system by a unified tax which gives equal treatment for foreign and domestic investors across the whole nation. Our results imply that such policy should be applied gradually from the east to west in the future.

8.4. Research Limitations

Although this study has extended and developed previous research in several ways, a complete and systematic time-series study on FDI and its impacts in China would require more resources than were made available for this study. There are still a number of specific limitations in this thesis that should be noted.

Firstly, on investigating FDI regional distribution in Chapter 5, some factors such as double tax relief, capital resources and business environment are not considered owing to data availability. The effect of double tax relief on FDI is of special relevance to China, which has direct implications on the effectiveness of China's foreign investment policies compared to other countries. However, this analysis would require large-scale, country-level data, which is currently difficult to collect especially for developing countries.

Secondly, the lack of country-level analysis also applies to Chapter 6, which examines the sectoral distribution of FDI in China. It will be an interesting future research topic to look at FDI in a certain sector and from a certain country because the factors that have impacts on the overall foreign investment may have different or no influence for individual countries. Moreover, some important factors such as tax incentives and government's policies on sector level[80] are not controlled in the econometric test due to the lack of relevant data.

Thirdly, this study only includes the labour costs in the estimation equations but make no allowance for the issue of other factor costs such as capital costs owing to data

[80] The government's policies for foreign investment in each sector are quite different. For example, manufacturing is among the first industries that allow FDI, while some other sectors such as finance and insurance, real estate, farming were only gradually opened to foreign investors after China has joined the WTO.

unavailability. Although tax effects in Chapter 5 may have partly controlled for capital costs, more detailed analysis about the effect of additional factor costs between regions and sectors should be extended in the future.

The final limitation relates to the change of tax legislations. In 2008, the Chinese Government introduced a new tax system to replace the previous double tax system which gave more favourable tax treatment to foreign enterprises. Under the new tax laws, foreign and domestic investors are subject to the same income tax rates. This means the tax incentives for foreign investors, which has been proved to be a critical driver of FDI by both this study and previous research, is to a large extent reduced, if not removed. The new tax policy will inevitably influence the decision making of foreign investors on whether or not to continue investing in China, and the impact of FDI on domestic investment as well. While it is too early to address the question in this thesis, reanalysing the empirical models once the data become available is highly warranted.

8.5. Future Research

Based on the research limitations discussed in Section 8.3, this section will set out in details the possible future research that can be extended from this study.

The first possible future research direction would be the improvement and update of the current data. This thesis only investigates FDI in China using secondary data from official databases. Secondary data is usually more authoritative and accurate and does not involve a large amount of time in data collection. However, secondary data may not perfectly suit the research needs for a study and sometimes it cannot reflect the latest information compared to primary data sources. Collecting primary data on FDI in a certain area (such as Beijing and Shanghai) or a certain industry (such as manufacturing and real estate) for analysis is therefore worth being explored in the future. This approach could overcome the problem of the lack of certain data (e.g., business environment variables) within country-level data. In this way, the patterns discovered from secondary data analyses can be used as a reference to the results from primary data analyses.

The second area of future research is the use of alternative methodologies. This study chooses empirical and quantitative approaches that use a large-scale dataset to examine

hypotheses and derive conclusions. Although there are obvious advantages for using this methodology (see Chapter 4), other analytical approaches such as case study has its own merit. Case study could provide in-depth information and details about the particular case being studied so it is a perfect means to undertake an intensive description and analysis of individuals or a group of individuals. In the context of this study, it would be interesting and helpful to use case study as the research methodology to investigate firm-level investment behaviours (e.g., the impacts of foreign technology via multinational enterprises' M&A, chain reaction and/or human capital).

A third future research topic would be extending the current research to examine new policies of FDI. As noted in the previous section, the Chinese Government has eliminated the double tax system which granted a lower rate of corporate tax (15% to 24%) for foreign investors than domestic investment (33%). The introduction of a unified tax regime in 2008 will definitely have direct impacts on FDI inflows, distributions and the relationship between FDI and domestic investment. It remains an interesting and fruitful research topic to investigate whether or not the evidence regarding FDI regional/distribution and displacement effects still persist when relevant data become more available.

Appendix A

Map of China

Appendix B

Exchange Rates of Chinese Yuan and Other Currencies

	TWD/CNY	SDG/CNY	KRW/CNY	USD/CNY	JAY/CNY	HKD/CNY
1991	0.212	3.36	0.00712	5.32	0.0396	0.685
1992	0.227	3.55	0.00728	5.51	0.0436	0.712
1993	0.219	3.62	0.00716	5.76	0.0520	0.744
1994	0.322	5.8	0.0107	8.62	0.0844	1.115
1995	0.306	5.9	0.01075	8.35	0.0892	1.080
1996	0.303	5.96	0.00985	8.31	0.0764	1.075
1997	0.253	4.93	0.0049	8.29	0.0686	1.071
1998	0.257	5.02	0.00686	8.28	0.0635	1.069
1999	0.264	4.97	0.00728	8.28	0.0729	1.067
2000	0.250	4.78	0.00654	8.28	0.0769	1.062
2001	0.237	4.48	0.0063	8.28	0.0681	1.061
2002	0.239	4.78	0.00698	8.28	0.0662	1.061
2003	0.244	4.88	0.00694	8.28	0.0715	1.062
2004	0.261	5.08	0.008	8.28	0.0766	1.062
2005	0.246	4.86	0.008	8.19	0.0745	1.053
2006	0.240	5.08	0.0084	7.97	0.0686	1.026
2007	0.225	5.08	0.0078	7.60	0.0646	0.975
2008	0.208	4.74	0.0054	6.95	0.0674	0.892

Source: *Administration of Foreign Exchange*

Bibliography

Agosin, M.R., and R. Machado, 2005, Foreign investment in developing countries: Does it crowding in domestic investment, *Oxford Development Studies* 33(2), 149-162.

Aharoni, Y., 1966, The foreign investment decision process, (Division of Research, Graduate School of Business Administration, Harvard University, Boston).

Alba, J.D., P. Wang, and D. Park, 2007, The impact of exchange rate on FDI and the interdependence of FDI over time, (Nanyang Technological University, Singapore).

Alfaro, L., and A. Charlton, 2007, Growth and the quality of foreign direct investment: Is all FDI equal, (Harvard Business School and NBER, London School of Economics. , London).

Ali, S., and w. Guo, 2005, Determinants of FDI in China, *Journal of Global Business and Technology* 1(2), 21-33.

Al-Sadig, A., 2009, The effects of corruption on FDI inflows, *Cato Journal* 29(2), 267-294.

Arellano, M., and S. Bond, 1991, Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, *Review of Economic Studies* 58, 277–297.

Arellano, M., and O. Bover, 1995, Another look at the instrumental variables estimation of error-components models, *Journal of Econometrics* 68, 29–51.

Auerbach, A.J., and K. Hassett, 1993, Taxation and foreign direct investment in the United States: A reconsideration of the evidence, *Studies in International Taxation* May, 114-144.

Barlow, E., and I. Wender, 1955, Foreign direct investment and taxation, (Prentice Hall,Englewood Cliffs, New Jersey).

Barrell, R., and N. Pain, 1996, An econometric analysis of U.S. Foreign direct investment, *Review of Economics and Statistics* 78 (2), 200-207.

Belderbos, R., 1997, Japanese electronics multinationals and strategic trade policies, (Oxford University Press, Oxford).

Billington, N., 1999, The location of foreign direct investment: An empirical analysis, *Applied Economics* 31, 65-76.

Blanchard, O.J., ed., 2008. *Crowding out* (2nd edition).

Blomstrom, M., and R.E. Lipsey, 1991, Firm size and foreign operations of multinationals, *Scandinavian Journal of Economics* 93 (1), 101-7.

Blonigen, B.A., 1997, Firm-specific assets and the link between exchange rates and foreign direct investment, *American Economic Review* 87(3), 447-65.

Blonigen, B.A., 2001, In search of substitution between foreign production and exports, *Journal of International Economics* 53(1), 81-104.

Blonigen, B.A., and R.B. Davies, 2004, The effects of bilateral tax treaties on us FDI activity, *International Tax and Public Finance* 11(5), 601-22.

Blonigen, B.A., C.J. Ellis, and D. Fausten, 2005, Industrial groupings and foreign direct investment, *Journal of International Economics* 65(1), 75-91.

Blundell, R.W., and S. Bond, 1998, Initial conditions and moment restrictions in dynamic panel data models, *Journal of Econometrics* 87, 115–43.

Blundell, R.W., S.R. Bond, and F. Windmeijer, 2000, Estimation in dynamic panel data models: Improving on the performance of the standard gmm estimators, (Institute for Fiscal Studies Working Paper).

Bo, w., 2006, Does FDI crowding in or crowding out domestic investment in China - panel data empirical analysis, *Caijingluncong (China)* 2006.

Borensztein, E., J. De Gregorio, and J.W. Lee, 1998, How does foreign direct investment affect economic growth?, *Journal of International Economics* 45, 115-135.

Boskin, M.J., and W.G. Gale, 1987, New results on the effects of tax policy on the international location of investment, Martin S, Feldstein (ed.) The Effects of Taxation on Capital Accumulation (University of Chicago Press, Chicago).

Bosworth, B.P., and S.M. Collin, 1999, Capital flows to developing economies: Implications to saving and investment, Brooking papers on Economic Activities 1 (Brooking Institutions).

Bowsher, C.G., 2002, On testing overidentifying restrictions in dynamic panel data models, *Economics Letters* 77, 211-220.

Bronzini, R., 2004, Foreign direct investment and agglomeration: Evidence from Italy, Bank of Italy Working Paper

Buckley, P.J., and M.C. Casson, 1976, The future of the multinational enterprise, (Homes & Meier, London).

Buckley, P.J., and M.C. Casson, 1985, The economic theory of the multinational enterprise, (MacMillan Press Ltd, London).

Buckley, P.J., and M. Casson., 1981, The optimal timing of foreign direct investment, *Economic Journal* 91(361), 75-87.

Buckley, P.J., J. Clegg, and C. Wang, 2002, The impact of inward of FDI on the performance of chinese manufacturing firms, *Journal of International Business Studies* 33(4), 637-655.

Buenos Aires, A., 2000, On the degree of openness of an open economy, (Carlos Alfredo Rodriguez, Universidad Del CEMA).

Campa, J.M., 1993, Entry by foreign firms in the U.S. Under exchange rate uncertainty, *Review of Economics and Statistics* 75(4), 614-22.

Cantwell, J.A., 1989, Technological innovation and multinational corporations, (Basil Blackwell, Oxford).

Cantwell, J.A., and P.E.E. Tolentino, 1990, Technological accumulation and third world multinationals, (Department of Economics, University of Reading).

Carlton, D.W., 1979, Why new firms locate where they do: An economic model, in William C.

Wheaton, ed.: Interregional Movements and Regional Growth (The Urban Institute, Washington D.C.).

Carlton, D.W., 1983, The location and employment choices of new firms: An econometric model with discrete and continuous endogenous variables, *Review of Economics and Statistics* 65, 440-449.

Cassou, S.P., 1997, The link between tax rates and foreign direct investment, *Applied Economics* 29, 1295-1301.

Caves, R., 1989, Exchange rate movements and foreign direct investment in the United States, The Internationalization of United States Markets (York University Press).

Caves, R.E., 1971, Industrial corporations: The industrial economics of foreign investment, *Economics* 38, 1 - 27.

Chakraborty, C., and P. Nunnenkamp, 2008, Economic reforms, FDI, and economic growth in india: A sectoral level analysis, *World Development* 36(7), 1192-1212.

Chantasasawat, B., K.C. Fung, H. Lizaka, and A. Siu, 2004, Foreign direct investment in east asia and latin america: Is there a people's republic of China effect?, (the Asian Development Bank Institute Discussion Paper).

Chen, C., L. Chang, and Y. Zhang, 1995, The role of foreign direct investment in China's post-1978 economic development, *World Development* 23(4), 691– 703.

Chen, C.H., 1996, Regional determinants of foreign direct investment in mainland China, *Journal of Economic Studies* 23(2), 18-30.

Cheung, K., and P. Lin, 2004, Spillover effects of FDI on innovation in China: Evidence from the provincial data, *China Economic Review* 15, 25-44.

Cho, S., and S. Tung, 1998, Special tax incentive zones and regional tax incentive policy in the people's republic of China, *The International Tax Journal* 24(4), 81–91.

Christian. W.S., U.B., ed., 2008. *The effect of exchange rate risk on U.S. Foreign direct investment: An empirial analysis* (Techn. Univ., Fak. Wirtschaftswiss).

Clausing, K., 2000, Does multinational activity displaces trade?, *Economic Inquiry* 38, 190-205.

Coughlin, C., and E. Segev., 2000, Foreign direct investment in China: A spatial econometric study, *The World Economy* 23(1), 1-23.

Coughlin, C.C., J.V. Terza, and V. Arromdee, 1991, State characteristics and location of foreign direct investment within the united states, *Review of Economics and Statistics* 73(4), 675-83.

Culem, C., 1988, Direct investment among industrialized countries, *European Economic Review* 32, 885-904.

Cumming, D.J., and J. MacIntosh, 2006, Crowding out private equity: Canadian evidence, *Journal of Business Venturing* 21, 569-609.

Cushman, D.O., 1985, Real exchange rate risk, expectations, and the level of direct investment, *Review of Economics and Statistics* 67(2), 297-308.

Dees, S., 1998, Foreign direct investment in China: Determinants and effects, *Economics of Planning* 31, 175-194.

Desai, M.A., F.C. Foley, and J. James R. Hines, 2004, Foreign direct investment in a world of multiple taxes, *Journal of Public Economics* 88(12), 2727-44.

Desai, M.A., and J. James R. Hines, 1999, Basket cases: Tax incentives and international joint venture participation by American multinational firms, *Journal of Public Economics* 71(3), 379-402.

Devereux, M.P., and R. Griffith, 2002, The impact of corporate taxation on the location of capital: A review, *Swedish Economic Policy Review* 9, 79-102.

Dixit, A., 1989, Entry and exit decisions under uncertainty, *Journal of Political Economy* 97(3), 620-38.

Du, J., Y. Lu, and Z. Tao, 2008, Economic institutions and FDI location choice: Evidence of us multinationals in China, *Journal of Comparative Economics* 36, 412–429.

Dunning, J.H., 1958, American investment in British manufacturing, (George Allen & Unwin, Ltd, London).

Dunning, J.H., 1977, Trade, location of economic activity and the multinational enterprise: A search for an eclectic approach, B. Ohlin, P.O. Hesselborn, P.J. Wijkman (Eds),Macmillan (London).

Dunning, J.H., 1980, Towards an eclectic theory of international production: Some empirical tests, *Journal of International Business Studies*, 9 - 31.

Dunning, J.H., 1988, The eclectic paradigm of international production: A restatement and some possible extensions, *Journal of International Business Studies* 19, 1 - 31.

Dunning, J.H., 1993, Multinational enterprise in the global economy (Addison-Wesley Publishing Company, Wokingham).

Dunning, J.H., 1995, Reappraising the eclectic paradigm in an age of alliance capitalism, *Journal of International Business Studies* 26(3), 461-491.

Dunning, J.H., 2003, Making globalization good, (Oxford University Press, Oxford).

Dunning, J.H., 2005, Institutional reform, foreign direct investment and European transition economies in gross. R. (ed), *International Business and Government Relations in the 21st Century,* (Cambridge University Press), 49-78.

Economist Intelligence Unit, 1997, EIU country report, Bolivia.

Ellingsen, T., and K. W¨arneryd, 1999, Foreign direct investment and the political economy of protection, *International Economic Review* 40, 357–379.

Feldstein, M., and J. Jun, 1986, The effects of tax rules on nonresidential fixed investment: Some preliminary evidence from 1980s, Nantional Bureau of Economic Research Working Paper.

Forsyth, D., 1972, Us investment in Scotland, (Praeger, New York).

Frankfort-Nachmias, C., and D. Nachmias, 1992, Research methods in the social sciences (St.

Martin's Press, New York).

Freeman, R., 1996, International labour standards and world trade: Friends or foes, Jeffrey Schott (ed.) The World Trading System: Challenges Ahead (Institute for International Economics, Washington, D.C.).

Friedman, J., H.Fung, D.Gerlowski, and J.Silberman, 1992, What attracts foreign multinational corporations? Evidence from branch plant location in the united states, *Journal of Reginal Science* 32, 403-418.

Froot, K.A., and J.C. Stein., 1991, Exchange rates and foreign direct investment" an imperfect capital markets approach, *Quarterly Journal of Economics* 106(4), 1191-1217.

Fry, M.J., 1993, FDI in a macroeconomic framework: Finance, efficiency, incentives, and distortions, working paper (World Bank, Washington, DC.).

Fujita, M., and D. Hu, 2001, Regional disparity in China 1985-1994: The effects of globalization and economic liberalization, *Annals of Regional Science* 35(1), 3-37.

Fung, K.C., H. Iizaka, and A. Siu, 2004, Foreign direct investment in east Asia and Latin America: Is there a people's republic of China effect?, WORKING PAPER (The 2004 Laeba Annual Conference, Beijing).

Fung, S.M., H. Lizaka, and S. Tong, 2002, Foreign direct investment in China: Policy, trend and impact, International Conference on 'China's Economy in the 21 Century' (Hong Kong).

Goldberg, L., and C. Kolstad, 1995, FDI, exchange-rate variability and demand uncertainty, *International Economic Review* 36(November), 855-873.

Graham, E.M., and P.R. Krugman, 1993, The surge in foreign direct investment in the 1980s, Foreign direct investment (University of Chicago Press., Chicago).

Graham, M.E., and P.R. Krugman, 1991, Foreign direct investment in the united states, working paper (Institute for International Economics, Washington, DC.).

Graham, M.E., and E. Wada, 2001, Foreign direct investment in China: Effects on growth and economic performance. , Achieving High Growth: Experience of Transitional Economies in East Asia (Oxford University Press, .Oxford).

Grubert, H., and J. Mutti., 1983, The location and employment choices of new firms: An econometric model with discrete and continuous endogenous variables, *The Review of Economics and Statistics* 65(3), 440-449.

Grubert, H., and J. Mutti., 1991, Taxes, tariffs and transfer pricing in multinational corporate decision making, *Review of Economics and Statistics* 73(2), 285-293.

Grubert, H., and J. Mutti., 2000, Do taxes influence where us corporations invest?, *National Tax Journal* 53, 825-839.

Guo, J., and P. Trivedi, 2002, Firm-specific assets and the link between exchange rates and Japanese foreign direct investment in the United States: A re-examination, *Japanese Economic Review* 53(3), 337-349.

Hadari, Y., 1990, The role of tax incentives in attracting foreign direct investments in select

developing countries and the desirable policy, *The International Lawyer* 24(1), 121-152.

Hall, R.E., and D.W. Jorgensen, 1967, Tax policy and investment behaviour, *American Economic Review* 57, 391-414.

Hansen, H., and R. J., 2004, On the causal links between FDI and growth in developing countries, Discussion paper 04-30 (Institute of Economics, University of Copenhagen).

Hansen, L., 1982, Large sample properties of generalized method of moments estimators, *Econometrica* 50, 1029–1054.

Harris, C., 1954, The market as a factor in the localization of industry in the united states, *Journal of the Association of American Geographers* 64, 315-348.

Hartman, D.G., 1981, Domestic tax policy and foreign investment: Some evidence, NBER Working Papers (National Bureau of Economic Research).

Hartman, D.G., 1984, Tax policy and foreign direct investment in the United States, *National Tax Journal* 37(4), 475-87.

Hausman, J.A., 1978, Specification tests in econometrics, *Econometrica* 46(6), 1251–1271.

He, X., and S. Guisinger, 1993, Taxation of us foreign direct investment abroad: Effective tax rates and tax policy competition in developed and developing countries, *Journal of International Accounting, Auditing and Taxation* 2(2), 215-229.

Head, K., and J.Ries, 1996, Inter-city competition for foreign investment: Static and dynamic effects of China's incentive areas, *Journal of Urban Economics* 40, 38-60.

Head, K., and T. Mayer, 2004, Market potential and the location of Japanese investment in the european union, *Review of Economics and Statistics* 86(4), 959-972.

Head, K., and J. Ries., 2001, Overseas investment and firm exports, *Review of International Economics* 9(1), 108-22.

Healy, P., and K. Palepu, 1993, International corporate equity associations: Who, where and why?, K. Froot ed. Foreign Direct Investment (University of Chicago Press, Chicago).

Helpman, E., 1984, A simple theory of trade with multinational corporations, *Journal of Political Economy* 92, 451-471.

Hill, S., and M. Munday, 1992, 'The UK regional distribution of foreign direct investment: Analysis and determinants, *Regional Studies* 26(6), 53-68.

Hines, J.R., Jr. , 1996, Forbidden payment: Foreign bribery and American business after 1977, (NBER Working Paper).

Hines, J.R., Jr. , 1999, Lessons from behavioural responses to international corporations, A.J. Auerbach (ed.), Fiscal Policy: Lessons from Economics Research (Cambridge MA: MIT Press.).

Hines, J.R., Jr. , and E.M. Rice, 1994, Fiscal paradise: Foreign tax havens and American business, *Quarterly Journal of Economics* 109, 149-182.

Ho, O.C.H., 2004, Determinants of foreign direct investment in China: A sectoral analysis, 16th Annual Conference of the Association for Chinese Economics Studies (Brisbane,

Australia, Australia (ACESA)).

Huang, Y., ed., 2003. *Selling China: Foreign direct investment during the reform era* (Cambridge University Press, New York).

Hymer, S.H., 1960, The international operations of national firms: A study of direct foreign investment, PhD Dissertation, Published posthumously (The MIT Press, Cambridge).

Itagaki, T., 1981, The theory of the mnf under exchange-rate uncertainty, *Canadian Journal of Economics* 14, 276-297.

James, J., and A. Sorensen, 2000, Archiving longitudinal data for future research. Why qualitative data add to a study's usefulness, *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research [On-line Journal]* 1(3), Art. 23. Available at: http://www.qualitative-research.net/fqs-texte/3-00/3-00jamessorensen-e.htm

Janicki, H., and P.V. Wunnvav, 2004, Determinants of foreign direct investment: Empirical evidence from EU accession candidates, *Applied Economics* 36, 505–509.

Jones, J., and C. Wren, eds., 2009. *Grants and the location of foreign direct investment: Evidence from the uk regions* (Edward Elgar).

Jorgenson, D., W., 1963, Capital theory and investment behaviour, *The American Economic Review* LIII(2), 247-259.

Jorgenson, D.W., 1971, Econometrics studies of investment behaviour: A survey, *Journal of Economics Literature* 9(4), 1111-1147.

Julan, D., Y. Lu, and Z. Tao, 2007, Economic institutions and FDI location choice: Evidence from u.S. Multinationals in China, (Chinese University of Hong Kong, Hong Kong).

Jun, J., 1989, Tax policy and international direct investment, National Bureau of Economic Research Working Paper (National Bureau of Economic Research, M.A.).

Jun, J., 1994, How taxation affects foreign direct investment (country-specific evidence), Policy Research Working Paper1307 (World Bank, Washington D.C.).

Junlin, M., 2007, An empirical study on the effects of FDI on the employment in China, *Economy and Management* 21(4).

Kaplan, D., 2004, The sage handbook of quantitative methodology for the social sciences, (London).

Kealey, D.J., and D.R. Protheroe, 1996, The effectiveness of cross-cultural training for expatriates: An assessment of the literature on the issue, *International Journal of Intercultural Relations* 20(2), 141-165.

Kiyota, K., and S. Urata, 2004, Exchange rate, exchange rate volatility and foreign direct investment, *The World Economy* 27(10), 1501-1536.

Klein, M.W., and E.S. Rosengren., 1994, The real exchange rate and foreign direct investment in the united states: Relative wealth vs. Relative wage effects, *Journal of International Economics* 36(3-4), 373-89.

Kogut, B., and S.J. Chang, 1996, Platform investments and volatile exchange rates: Direct

investment in the U.S. By Japanese electronics, *Review of Economics and Statistics* 78(2), 221-31.

Kohlhagen, S.W., 1977, The effect if exchange-rate adjustments on international investment: Comment, P.B. Clark, D.E. Logue and R.Sweeney (eds.) The Effect of Exchange Rate Adjustments (US Government Printing Office, Washington, DC).

Kojima, K., 1973, A macroeconomic approach to foreign direct investment, *Hitotsubashi Journal of Economics* 14, 1-20.

Kojima, K., 1975, International trade and foreign direct investment: Substitutes or complements, *Hitotsubashi Journal of Economics* 16, 1-12.

Kojima, K., 1977, Theory of foreign direct investment, (Diamond, Tokyo).

Kravis, I., and R. Lipesey, 1982, The location of overseas production and production for export by us multinational firms, *Journal of International Economics* 12(3-4), 201-23.

Kucera, D., 2001, The effects of core workers rights on labour costs and foreign direct investment: Evaluating the 'conventional wisdom', Discussion Paper (ILO International Institute for Labour Studies).

Kucera, D., 2002, Core labour standards and foreign direct investment, *International Labour Review.*, 33-39.

Kumar, N., 2001, Infrastructure availability, foreign direct investment inflows and their export-orientation: A cross-country exploration, Research and Information System for Developing Countries (New Delhi).

Lahiri, S., and F. Mesa, 2006, Local content requirement on foreign direct investment under exchange rate volatility, *International Review of Economics and Finance* 15(3), 346-363.

Lai, E., R. Riezman, and P. Wang, 2009, Outsourcing of innovation, *Economic Theory* 38(3), 485-515.

Lai, P., 2002, Foreign direct investment in China: Recent trends and patterns, *China and World Economy* 2, 25-32.

Lan, W., and Q. Yin, 2009, Analysis of economic factors attracting FDI in west China since reform and opening-up, *International Journal of Business and Management* 4(2), 26-30.

Lim, D., 1983, Fiscal incentives and direct foreign investment in less developed countries, *Journal of Development Studies* Jan., 207-212.

Lipsey, R.E., and M.Y. Weiss, 1981, Foreign production and exports in manufacturing industries, *Review of Economics and Statistics* 63(4), 488-94.

Lipsey, R.E., and M.Y. Weiss, 1984, Foreign production and exports of individual firms, *Review of Economics and Statistics* 63(4), 488-94.

Lu, M., 2000, The location determinants of foreign direct investment, (Nanjing University Press, Nanjing).

Markusen, J., and K.E. Maskus, 2002, Discriminating among alternative theories of the

multinational enterprise, *Review of International Economics* 10(4), 694-707.

Markusen, J.R., 1984, Multinationals, multi-plant economies, and the gains from trade, *Journal of International Economics* 16, 205-226.

Martin, P., and C.A. Rogers, 1995, Industrial location and public infrastructure, *Journal of International Economics* 39, 335–351.

Mathiyazhagan, M.K., 2005, Impact of foreign direct investment in Indian economy: A sector level analysis, ISAS working paper (Institute of South Asian Studies).

Milner, C., and E. Pentecost, eds., 1994. *The determinants of the composition of us foreign direct investment in UK manufacturing* (Edward Elgar, London).

Misun, J., and V. Tomsik, 2002, Does FDI crowding in or crowding out domestic investment?, *Eastern European Economics* 40(2), 38-56.

Mizen, P., and E.J. Pentecost, 1994, Evaluating the empirical evidence for currency substitution: A case study of the demand for sterling in Europe, *Economic Journal* 104, 1057-1069.

Mooij de, R.A., and S. Ederveen., 2001, Taxation and foreign direct investment: A synthesis of empricial research, (CPB Discussion Paper The Hagul).

Moore, M.L., B.M. Steece, and C.W. Swenson, 1987, An analysis of the impact of state income tax rates and bases on foreign investment, *The Accounting Review* 62(4), 671-685.

Mudambi, R., 1995, The MNE investment location decision: Some empirical evidence, *Managerial and Decision Economics* 16, 249-257.

Mundlak, Y., 1978, On the pooling of time series and cross section data, *Econometrica* 46(1), 69-85.

Murthy, N.R.V., 1989, The effects of taxes and rates of return on foreign direct investment in the united states: Some econometric comments, *National Tax Journal* 42(2), 205-07

Na, L., and W.S. Lightfoot, 2006, Determinants of foreign direct investment at the regional level in China, *Journal of Technology Management in China* 1(3), 262-278.

Nachum, L., and C. Wymbs, 2002, Firm-specific attributes and MNE location choices financial and professional service FDI to New York and London, Cambridge University Working Paper (Cambridge University, Cambridge).

National People's Congress, 1979, Law of people's republic of China on joint ventures using chinese and foreign investment, (State Council, Beijing).

National People's Congress, 1980, Law of the people's republic of China on the income tax of the China-foreign joint ventures, (State Council, Beijing).

National People's Congress, 1981, Law of foreign enterprise income tax, (State Council, Beijing).

National People's Congress, 1983, Act on the implementation of the law on joint ventures, (State Council, Beijing).

National People's Congress, 1986, The law of enterprises operated exclusively with foreign capital, (State Council, Beijing).

National People's Congress, 1986, Law on enterprises operated exclusively with foreign capital, (State Council, Beijing).

National People's Congress, 1986, Notice for further improvement in the conditions for the operation of foreign invested enterprises, (State Council, Beijing).

National People's Congress, 1986, Provisions of the state council of the people's republic of China for the encouragement of foreign investment, (State Council, Beijing).

National People's Congress, 1991, Corporate income tax law for enterprises with foreign investment and foreign enterprise, (State Council, Beijing).

National People's Congress, 1995, Provisional guidelines for foreign investment projects, (State Council, Beijing).

Navaretti, G.B., and A.J. Venables, 2004, Multinational firms in the world economy, (Princeton University Press, New Jersey).

Newlon, T.S., 1987, Tax policy and multinational firms' financial policy and investment decisions, PhD dissertation (Princeton University).

Nickell, S., 1981, Biases in dynamic models with fixed effects, *Econometrica* 49, 1417-1426.

OECD, 1996, Trade, employment and labour standards: A study of core workers' rights and international trade., (OECD, Paris).

Pain, N., and D. van Welsum, 2003, Financial liberalisation, alliance capitalism, and the changing structure of financial markets, Alliance Capitalism and Corporate Management –Entrepreneurial Cooperation in Knowledge Based Economies Economies (eds. J.H. Dunning and G. Boyd) (Edward Elgar).

Panayides, P.M., D.W. Song, and D. Nielsen, 2002, Foreign direct investment in China: The case of shipping and logistics corporations, International Association of Maritime Economists Conference (IAME) (Panama).

Papke, L.E., 1987, Subnational taxation and capital mobility: Estimates of tax-price elasticises, *National Tax Journal* XL, 191-203.

Papke, L.E., 1991, Interstate business tax differentials and new firm location: Evidence from pannel data, *Journal of Public Economics* 45, 47-68.

Ponce, A.F., 2006, Openness and foreign direct investment: The role of free trade agreements in latin america, (University of Connecticut).

QUÉRÉ, A.B., L. FONTAGNÉ, and A. LAHRÈCHE-RÉVIL, 2001, Exchange-rate strategies in the competition for attracting foreign direct investment, *Journal of the Japanese and International Economies* 15, 178-198

Ray, E.J., 1989, The determinants of foreign direct investment in the united state, 1979-85, in Robert C. Feenstra (ed.) Trade policies for international competitiveness (The University of Chicago Press, Chicago).

Razin, A., E. Sadka, and H. Tong, 2005, Bilateral FDI flows: Threshold barriers and productivity shocks, NBER Working Paper

Redding, S., and A.J. Venables, 2004, Economic geography and international inequality, *Journal of International Economics* 62, 53-58.

Rodrik, D., 1996, Understanding economic policy reform, *Journal of Economic Literature* XXIV, 9-41.

Romer, P., 1993, Idea gaps and object gaps in economic development, *Journal of Monetary Economics* 32, 543-573.

Roodman, D.M., 2008, How to do xtabond2: An introduction to "difference" and "system" gmm in Stata, Working paper 103 (Center for Global Development).

Roodman, D.M., 2009, A note on the theme of too many instruments, *Oxford Bulletin of Economics and Statistics* 71(1), 135-158.

Root, F.R., and A.A. Ahmed, 1978, The influence of policy instruments on manufacturing direct foreign investment in developing countries, *Journal of International Business Studies* 9(3), 81–93.

Sargan, J.D., 1958, The estimation of economic relationship using instrumental variables, *Econometrica* 26, 393-415.

Sarna, R., 2005, The impact of core labour standards on foreign direct investment in east Asia, Working paper (The Japan Institute for Labour Policy and Training, Tokyo, Japan).

Scholes, M.S., and M.A. Wolfson, 1989, The effects of changes in tax law on corporate reorganization activity, Stanford University Working Paper (Stanford University).

Scholes, M.S., and M.A. Wolfson, 1992, Taxes and business strategy. A planning approach, Englewood Cliffs (Prentice-Hall, NJ).

Scholes, M.S., and M.A. Wolfson., 1990, The effects of changes in tax law on corporate reorganization activity, *Journal of Business* 63, 141-164.

Selmord, H., 1990, Ax effects on foreign direct investment in the U.S.: Evidence from a cross-country comparison, in Assaf Razin and Joel Slemord (eds.), Taxation in the Global Economy (University of Chicago Press, Chicago).

Shan, J., 2002a, A VAR approach to the economics of FDI in China, *Applied Economics* 7(34), 885-93.

Shan, J., 2002b, A macroeconomic model of income disparity in China, *International Economic Journal* 16(2), 47-63.

Shepotylo, O., 2006, Reginal governance infrastructure: The positive externality on the inflow of foreign direct investment, Working paper (Available at SSRN).

Sjöholm, F., 2008, The effect of FDI on employment and technology in China, working paper (Research Institute of Industrial Economics and Örebro University).

Stevens, G., 1992, Exchange rates and foreign direct investments: A note, International Finance Paper (Board of Governors of the Federal Reserve System, Washington D.C.).

Stevens, G.V.G., 1998, Exchange rates and foreign direct investment: A note, *Journal of Policy Modelling* 20(3), 393-401.

Sun, H., and A. Parikh, 2001, Exports, inward foreign direct investment (FDI) and regional economic growth in China, *Regional Studies Taylor and Francis Journals* 35(3), 187-196.

Sun, Q., W. Tong, and Q. Yu, 2002, Determinants of foreign direct investment across China, *Journal of International Money and Finance* 21(1), 79-113.

Svensson, R., 1996, Effects of overseas production on home country exports: Evidence based on Swedish multinationals, *Weltwirtschaftliches Archiv* 132, 304-29.

Swenson, D.L., 1994, The impact of us tax reform on foreign direct investment in the united states, *Journal of Public Economics* 54, 243-266.

Swenson, D.L., 2004, Foreign investment and mediation of trade flows, *Review of International Economics* 12(4), 609-29.

Tischler, L., J. Biberman, and R. McKeage, 2002, Linking emotional intelligence, spirituality and workplace performance: Definitions, models and ideas for research, *Journal of Managerial Psychology* 17(3), 203 - 218.

Tomlin, K., 2000, The effects of model specification on foreign direct investment models: An application of count data models, *Southern Economic Journal* 67(2), 460–8.

Trevino, L.J., and R. Grosse, 2002, An analysis of firm-specific resources and foreign direct investment in the united states, (The University of Southern Mississippi, Department of International Business, Hattiesburg).

Tsen, W.H., 2005, The determinants of foreign direct investment in the manufacturing industry of Malaysia, *Journal of Economic Cooperation and Development* 26(2), 91-110.

Tung, S., and S. Cho, 2000, The impact of tax incentives on foreign direct investment in China, *Journal of International Accounting, Auditing & Taxation* 9(2), 105-135.

Tung, S., and S. Cho, 2001, Determinants of regional investment decisions in China: An economic model of tax incentive policy, *Review of Quantitative Finance and Accounting* 17, 167-185.

Vernon, R., 1966, International investment and international trade in the product cycle, *Quarterly Journal of Journal of Economics* 80(2), 190-207.

Vu, T.B., and I. Noy, 2009, Sector analysis of foreign direct investment and growth in developed countries, *Journal of International Financial Markets, Institutions &Money* 19(2), 402-413.

Wang, M., and w. He, 2009, The effect of FDI on domestic investment of China, *Journal of Wenzhou University .Social Sciences* 22(4).

Wang, Z., and Z. Li, 2004, Re-examine the crowd in or crowd out effects of FDI on domestic investment, *Statistical Research* July, 37-43.

Wells, L.T., 1976, The internationalization of firms from the developing countries, (Cambridge mass, MIT Press, London).

Wells, L.T., 1983, The third world multinationals: The rise of foreign investment in developing

countries, (Cambrige MA. MIT press, London).

Wheeler, D., and A. Mody., 1992, International investment location decisions: The case of U.S. Firms, *Journal of International Economics* 33(1-2), 57-76.

Whyman, P., and M. Baimbridge, 2006, Labour market flexibility and foreign direct investment, Employment Relations Occasional Paper (Department of Trade and Industry).

Wijeweera, A., R. Villano, and B. Dollery, 2010, Economic growth and FDI inflows: A stochastic frontier analysis, *The Journal of Developing Areas* 43, 143-158.

Windmeijer, F., 2005, A finite sample correction for the variance of linear efficient two-step gmm estimators, *Journal of Econometrics* 126, 25-51.

Xing, Y., and L. Zhao, 2003, Reverse imports, foreign direct investment, and exchange rates, working paper No.2003-4 in International Development Series (the Research Institute of International University of Japan).

Young, K.H., 1988, The effects of taxes and rates of return on foreign direct investment in the united states, *National Tax Journal* 41, 109-121.

Zhang, K., 1999, FDI and economic growth: Evidence from ten east Asian economies, *Economia Internazionale,* Nov. 54(4), 517- 535.

Zhao, H., and G. Zhu, 2000, Location factors and country of origin differences: An empirical analysis of FDI in China, *Multinational Business Review* 8(1), 60–73.

Zhao, Z.P., 2001, FDI utilization and economic growth in China, (Beijing: People's Press(in Chinese), Beijing).