What are the determinants of producer services FDI in China? Aggregate and sub-sectoral data analyses

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Abstract

This PhD thesis joins a vibrant conversation in a vastly under researched area pertaining to the determinants of producer services foreign direct investment (FDI). It begins by extensively revisiting the existing literature and discussing critically gaps from past study to then adopt a quantitative research method assisted by secondary data collected from various databases. The research question that this thesis addresses is: "What are the determinants of producer services FDI in China? Aggregate and sub-sectoral data analyses". With this aim in mind, this thesis employs aggregate as well as provincial and sub-sectoral data obtained from the CEIC Data's China Premium Database, National Bureau of Statistics of China, Provincial Statistical Yearbooks, Ministry of Commerce of China, Ministry of Transport of China, Ministry of Industry and Information Technology as well as a range of other relevant data drawn from national and provincial sources.

China is exhibiting an enormous amount of economic and urban development accompanied by a transformation from its past manufacturing-focused economy towards one based on producer services. The conceptual framework developed for this research is guided by the identified research gap found in the literature on the determinants of FDI. The methodology employed is the Autoregressive Distributed Lag (ARDL) cointegration approach and panel data regression techniques to quantitatively investigate the determinants of Chinese producer services FDI at the aggregate and sector-disaggregated level.

This research has revealed that there is a significant difference between the determinants of aggregate FDI and Producer Services FDI (PSFDI). The empirical evidence demonstrates that in contrast to the general influencing factors determining aggregate FDI (e.g., GDP, trade openness, low wages and environmental quality), high wages and research intensity are strikingly discovered to have a notable influence on determining PSFDI inflows to China. The evidence captured contends that following appropriate strategies and policies to specifically foster the attraction of PSFDI is of paramount importance for Chinese regulators.

Collectively, the main novel findings of this research that make a significant contribution to knowledge rest with a broader understanding of the newly identified determinants of PSFDI inflows in China through a rigorous, evidence-based scientific process of inquiry. The thesis' contribution adds to ongoing literature by accentuating that China's aggregate FDI attraction differs from PSFDI's attraction and that stimulating PSFDI inflows requires different policy measures. The pivotal implication for Chinese policymakers is to develop appropriate policies specifically targeted at attracting inward PSFDI and to implement sub-sector specific policies to encourage PSFDI in those sub-sectors most susceptible to attract PSFDI.

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Table of Contents

Figures

Tables

Chapter One: Introduction

1.1 Chapter Overview

This chapter provides the background and rationale of this PhD study. Section 1.2 briefly reviews the context: academic knowledge related to Foreign Direct Investment (FDI) and the producer services industry. Section 1.3 provides reasonable grounds for investigating producer services FDI (PSFDI) with an explanation as to why this PhD study focuses on China. Next, Section 1.4 highlights the research gap that has been identified, and thereafter, some further justifications as to why filling this gap is important. Section 1.5 sets forth the research aim (main research question) of the study, the associated objectives, and the hypotheses to be tested in order to answer the main research question. Section 1.6 delineates the boundaries of this research by defining clearly what will be the central interest of the study, what falls outside its scope, and the reasons why these selections are made. Section 1.7 summarises the contribution to knowledge. Finally, the structure of the remainder of the thesis is presented in Section 1.8.

1.2 Academic Background

Foreign Direct Investment (FDI) relates to the flow of capital between economies, facilitating a party (company) from one country to expand its production and commerce in another country and help direct investors' quest for a profitable, lasting interest. This PhD thesis meticulously deliberates and empirically assesses the determinants of Chinese inward FDI in a thriving knowledge-intensive domain called producer services. As defined by the Organisation of Economic Co-operation and Development (OECD, 2008), FDI reflects a category of investment whereby an enterprise in one country establishes a production facility in another country either setting up a subsidiary from scratch or by acquisition of a foreign firm. The investment, therefore, reflects a lasting interest in the foreign enterprise in the recipient country. FDI is regarded as an essential vehicle that promotes economic growth and integration and provides an opportunity to foster stable and long-lasting links between nations. Additionally, the foreign capital inflow in the host (FDI recipient) country permits the creation of a more competitive

environment, generating employment opportunities and increasing productivity, further enhancing FDI attraction (see, for example, De Vita and Kyaw, 2008). FDI can also act as a vehicle to acquire sophisticated technology via spillovers and promote higher efficiency and superior (higher quality) products and services (Urban, 2010).

As a vital corporate and foreign market-entry strategy, FDI facilitates companies gaining a certain degree of international exposure and to better deploy resources both in the home country and foreign markets. Aside from that, foreign companies tend to engage in FDI to avoid trade barriers, reduce production costs, expand market opportunities and obtain local support (De Jesus Noguera and Rowena, 2011). The drive of multinational corporations (MNCs) - also known as multinational enterprises (MNEs) - for entering foreign markets through FDI has been rationalised from multiple standpoints and on a multiplicity of grounds, such as economic growth, trade openness, market size, wage variables and infrastructure quality (De Vita and Lawler, 2004; Asongu et al., 2018). This PhD study will focus on examining the FDI determinants in the producer services sector, which has attracted only limited attention in relevant literature to date.

It is now important to provide a clear and exhaustive definition of producer services and explain why the producer services sector carries special significance for inward FDI. To this end, it is first of paramount importance to clarify what a 'service' is, and how it differs from 'goods'. 'Goods' are exchangeable and/or tradeable physical objects whose physical attributes are preserved over time with ownership rights that can be established independently of their owners (Hill, 1999). On the other hand, since the pioneering work of Fisk et al. (1993), the literature is unanimous in classifying a 'service' on the basis of it being: Intangible; Heterogeneous; Inseparable; and Perishable. These four features - generally referred to as 'IHIP' characteristics - are unanimously considered the constituent elements of what defines a 'service'. Turning to the question of how general 'services' differ from 'producer services', unlike general services, intended to fulfil final consumer demand, i.e., activities for, interactions with, and solutions to the final consumer (see, e.g., the review by Edvardsson et al., 2005), producer services provide service inputs to intermediate demand by other producers. As originally defined by Greenfield (1966, p. 1), still considered the most authoritative

definition of 'producer services', producer services are "*those services which business firms, non-profit institutions, and government provide and usually sell to the producer rather than to the consumer*". In chapter 3, I will elaborate further on the main attributes of 'producer services', from inception of the concept to date, according to the different emphasis placed by various authors' definitions on different features of producer services (see, e.g., Table 3.3). Nevertheless, by way of introduction, it should suffice to say that producer services typically involve the generation and exchange of information and knowledge, rely on skills and intellectual capital as the main inputs (Coffey, 2000) and are generally customised to some extent, meaning that they are not generally good substitutes for the services of other firms (Markusen et al., 2005). Specific service categories of producer services include financial, insurance, scientific and technical, brokerage and other knowledge-intensive activities that provide professional services to business clients (Browning and Singlemann, 1975).

The distinction between consumer and producer services is important since the latter are essential to foster economic growth, promote technological progress and facilitate industrial development, thus improving the production efficiency of a nation. In short, producer services represent a driving force for a country's structural optimisation, playing a pivotal role in the upgrading and competitiveness of a country's primary, secondary and tertiary sectors. Indeed, a growing body of evidence and economic theory suggests that the close availability of a diverse set of business services is important for economic growth. The key idea in the literature, as summarised by Markusen et al. (2005), is that a diverse or higher quality set of business services allows downstream users to purchase a quality-adjusted unit of business services at a lower cost. As early as the 1960s, the urban and regional economics literature (e.g., Greenfield, 1966) recognised the importance of non-tradable intermediate goods - mainly producer services produced under conditions of increasing returns to scale - as a critical source of agglomeration externalities. Given such benefits, FDI has often been considered as a powerful vehicle to enhance the development of producer services. The limited empirical evidence supports the view that the largest benefits of FDI in business services could be expected from positive spillover effects to the local economy, "*related to the transfer of knowledge and skills, to indirect productivity of business services and to the improvement of their quality and range*" (Stare, 2001, p. 19).

Producer services, therefore, have rightfully earned consideration as a crucial economic sector that carries special significance for inward FDI.

1.3 Why the focus on China's producer service FDI?

Since China's accession to the World Trade Organisation (WTO), FDI into China has gradually increased. In 2003, the total amount of FDI into China exceeded that of the United States, becoming the world's largest FDI recipient.

Evidently, China's spectacular economic development and strengthened organisational capacity owes much to the tangible FDI policies over the years, highlighting the increasingly essential role of inbound FDI in the country's aspirations for sustainable development. As can be seen from Figure 1.1, the remarkable FDI growth in China during the last number of decades attests to the contribution of the highly decentralised foreign investment approval and policy implementation to the robust competition for FDI. China experienced a marked rise in FDI between 2009 and 2010, 2017 and 2018, from USD 131.06 billion to 243.70 billion (+43%), USD 166.08 billion to 235.37 billion (+29%) (own calculations based on the data from the World Bank Database, available at: https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD). As a result, in 2019, China had the second largest FDI inflows in the world after the United States and was the largest FDI recipient among Asian countries. This foreign capital is essentially oriented towards the high-tech sectors, e.g., computer services, scientific research and financial intermediation (UNCTAD, 2020). Nevertheless, it is noteworthy to mention that the Chinese government can be more restrictive compared to other sizeable economies regarding foreign inflows. Attracting the right kind of FDI inflows, improving the investment environment and moving up the value chain appears to place higher importance on China's solid economic growth in general.

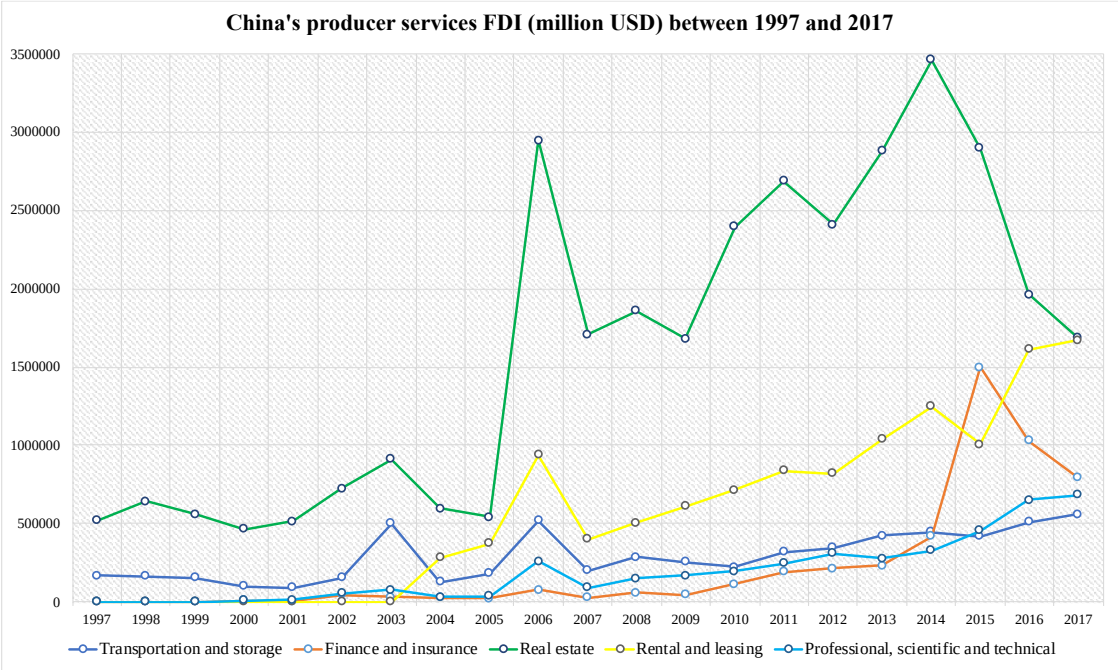
Figure 1.1: Foreign direct investment net inflows between 2000 and 2019

Source: The World Bank (https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD)

Against this backdrop, the scale of FDI in China's service industry has also expanded. Since the 1990s, an essential feature of FDI has been the increasing proportion of services. In parallel to the steady growth of FDI in the service industry, the amount of PSFDI has also been accelerating in China (see Figure 1.2). As Noyelle (1997) states, the basis for high efficiency of foreign providers of producer services is the specialised knowledge and skills that are proprietary assets, leading to innovations that are diffused throughout the economy. However, this does not refer to technology transfer in its narrowest sense, but to 'soft technology', meaning the transfer of professional knowledge, skills and experience to employees in the host country. Although the use of foreign capital in China's service industry has exceeded the scale of manufacturing FDI, a critical problem facing the opening-up of China's service industry is that the structure of the sector is unbalanced, and technological content is not high. The distribution of FDI within China's service sector is shown in Figure 1.2. Overall, FDI in the 'Real estate' sector has always dominated. But there is a significant shortcoming, with FDI concentrated too much on non-traditional service industries with higher

profits such as real estate, indicating that the structure of FDI in China's service industry needs to be optimised and upgraded.

Figure 1.1: China's Producer services FDI (million USD) between 1997 and 2017



Source: Author's own calculations based on data from China Statistical Yearbook (1996 – 2018).

The above propositions and observations should suffice in modernisation how devoting attention to inward PSFDI, also at sub-sectoral level, is not only important at a theoretical level, but also to gauge how better to leverage the attraction of high-value inward FDI in the contemporary investment landscape, particularly in countries like China, whose economic growth contributes one quarter of global growth in output and international trade. The determinants of FDI have been studied comprehensively in previous theoretical and empirical research (see, e.g., the reviews by Agarwal, 1980; De Vita and Lawler, 2004; Abbott et al., 2012), also with respect to China (e.g., Sun et al., 2002; Barros et al., 2013; Belkhodja et al., 2017) where variables such as GDP, human capital, infrastructure, openness, and agglomeration economies, have been found to be significant. However, studies on PSFDI, especially in the context of China, can be counted on one hand, and next to nothing is known about the specific FDI determinants at the sub-sector level of Chinese producer services.

1.4 Justification and research gap

As discussed above, there has been limited published research focusing on PSFDI location choice and studies relating to China are even fewer. Furthermore, the few studies available mostly concentrate on specific services sector industries such as insurance and financial institutions. Based on the differential Generalised Methods of Moments (GMM) estimation, Yin et al. (2014) investigate the major influencing factors of FDI by using data from 17 Chinese provinces between 2000 and 2010. Their results suggested that growth potential, purchasing power, the development of the service industry, labour costs and agglomeration effects significantly impact FDI flows to the service industry. They also pointed out that China's FDI in services is mainly driven by 'market-seeking' and 'client-following' motives. Nevertheless, their data sample is relatively small, and some variables can be either optimised or replaced. Most importantly, the heterogeneous nature of business activities across service sectors is not accounted for by Yin et al. (2014), which means they do not use disaggregated data alongside conducting novel research at the sub-sector level.

At this point, it is important to highlight the shortage of a full-blown theory of producer services based on the fact that most of the studies cited above developed hypotheses that draw from theories of FDI in manufacturing. That said, Dunning and McQueen (1982) argued that FDI theory developed with particular reference to manufacturing FDI, could also be employed to explain FDI in services and the majority of determinants are supposed to be similar. But is this the case?

This PhD thesis aims to challenge and test this view by conducting research aimed at empirically establishing whether such a proposition holds. Specifically, the present study tests whether the determinants of China's PSFDI inflows are different from the general determinants of China's FDI inflows. The underlying expectation is that there may be a noticeable difference between the determinants of aggregate FDI and FDI in producer services. According to Dunning (1988), the competitive labour cost advantage has long been considered an important positive factor for attracting FDI, and higher wages are usually suggested to discourage FDI. However, the foothold of a highly skilled worker pool plays an increasingly attractive role in attracting FDI with respect

to low wages (Madarassy and Pfeffermann, 1992). Plus, if higher labour costs are related to higher labour quality in terms of a more educated and/or skilled labour force, which in turn leads to higher productivity, then labour costs can be reasonably expected to be positively associated with FDI. This is especially true of PSFDI which, as noted earlier, heavily relies on professional knowledge, higher-level skills and intellectual capital as the main inputs (Coffey, 2000).

Although many empirical studies have examined the determinants of FDI in manufacturing, services or both, much less attention has been devoted to the factors influencing specifically FDI in producer services, particularly in the context of China, leaving a glaring gap to be filled by this PhD study. As such, this research aims to fill the identified research gaps from the existing literature and ascertain the determinants of producer services FDI flows into China. It provides a comprehensive picture of foreign investors' preferred locational determinants for producer services FDI in China.

1.5 Research aim and associated objectives

This research examines the determinants of aggregate FDI and producer services FDI (PSFDI) in China using both country aggregate, and provincial, sub-sectoral data. It reviews the differences between FDI and PSFDI determinants to establish the influencing factors that drive foreign investors' interests by analysing existing theoretical and empirical literature, to develop a deeper understanding of why foreign companies have different investment locational priorities when investing in aggregate FDI and PSFDI. An empirical investigation follows, leading to findings that carry important policy implications.

1.5.1 Main research question

The main research question proposed in this research is: **'What are the determinants of producer services FDI in China at country aggregate, and provincial, sub-sectoral levels?'.**

A greater understanding of foreign investors' key consideration when investing in PSFDI in China will be achieved with respect to answering this research question. The findings of this research represent a welcome addition to the literature in an ambiguous area where little attention has been paid to investigating the determinants of PSFDI in general, and China in particular. As China has a steadily growing economy, many researchers have examined the determinants of FDI in manufacturing or general services, and not enough coverage is being given to investigate specifically PSFDI influencing factors.

1.5.2 Research Hypotheses

Three research hypotheses are proposed, as pointed out below, in terms of how best to answer the main question.

Hypothesis 1: The determinants of Chinese FDI inflows in the producer services sector are different from the general determinants of Chinese FDI inflows (using national level time series data).

Hypothesis 2: The determinants of China's producer services FDI (PSFDI) and total FDI vary when using Chinese provincial level panel data.

Hypothesis 3: The determinants of Chinese producer services FDI inflows may differ across sub-sectors of producer services.

1.5.3 Research Objectives

In terms of searching for more specific and well-founded answers, it is necessary to attach special significance to the following research objectives:

1) To perform a substantial critical literature review of the fundamental FDI theories and the influencing factors of aggregate FDI and producer services FDI by critically elucidating the relevant theoretical and empirical literature and, following that, deriving testable hypotheses.

2) To develop a conceptual framework of hypotheses to address some specifics related to the main research questions. As per the three hypotheses outlined below:

- To test empirically the determinants of China's aggregate FDI and producer services FDI at the country aggregate level.

- To investigate empirically the determinants of China's aggregate FDI and producer services FDI using provincial level data.

- To estimate empirically the determinants of China's aggregate FDI and producer services FDI at sub-sectoral level.

3) To collect the data and identify a suitable empirical methodology while acknowledging its merits and limitations.

4) To test the hypotheses and obtain valid and reliable estimation results pointing out any differences in the determinants of China's aggregate FDI inflows and China's producer services FDI inflows.

5) To put forward some targeted policy implications for Chinese policymakers for enhancing the attraction of producer services FDI.

1.6 Boundaries of the study

The purpose of this PhD study is to empirically examine the determinants of FDI in producer services in China using both country aggregate, and provincial sub-sectoral data. As such, data collection will be exclusively limited to secondary data from publicly available databases. Time and expense prevented the extension of the database to primary data by means of interviews and/or focus groups, which nevertheless would have been difficult to undertake during a socially distanced environment due to the Covid-19 pandemic, a period which has necessitated the widespread use of barriers to international travel. Moreover, whilst such qualitative methods could have offered additional insights on the motivations for PSFDI, the interest of this thesis, as defined by its narrow empirical scope, centred on the statistical significance of the key determinants of PSFDI and whether these main determinants differ from those of general FDI in China, questions that are more suitably answered by a quantitative empirical analysis such as that conducted in the present study using econometrics.
Given the above, it should also be acknowledged that whilst this PhD study includes a comparative analysis of the influencing factors of general inward FDI in China, interest focused exclusively on the determinants of FDI and PSFDI. This distinct scope dictated the exclusion from the review of relevant literature of, for example, a vast amount of studies on the impact of FDI on various economic variables, such as growth and innovation (which were, therefore, outside the primary domain of investigation).

Another similar 'boundary decision' had to be made concerning the exclusion from this research of contributions from contiguous research domains, as in this literature boundaries can become somewhat fuzzy. In this respect, this research excluded theoretical and empirical studies focusing on FDI spillovers (including global welfare), the interdependencies between FDI and multinational enterprises' foreign market-entry strategies (e.g., licensing and offshoring), and subsidiary performance, topics that were clearly beyond the scope of the present study. Macro-level studies dealing with Outward FDI (OFDI) are also excluded from the review and analysis, whose exclusive focus rests on Chinese FDI inflows.

1.7 Contribution

This PhD thesis makes a significant, original contribution to our knowledge of the determinants of FDI with a specific focus on the determinants of PSFDI in China. The study demonstrates the key influencing factors that determine Chinese inward FDI in producer services, highlighting also that FDI depends on the source and type of industry. Previous theoretical and empirical literature shows that the influence of various variables remains ambiguous. This study adds to what has been found before by showing that FDI flows into different industries are affected in different ways by countries' economic conditions as well as development indicators. The research uses a dataset that breaks down PSFDI inflows into sub-sectoral investments and employs both time series and panel data analysis approaches to address the research question, an analysis that is absent in the existing literature. The work contributes to the literature, first, by investigating the still unsettled question of whether the determinants of Chinese inward PSFDI differ from those of aggregate inward FDI, and then by delving into the question of the key determinants of PSFDI at the sub-sector level. To sum up, the empirical findings and their associated inferences contribute to existing knowledge relating to the producer services FDI determinants and give a special emphasis on insightful wisdom in international business research and practice.

1.8 Structure of the thesis

This chapter (Chapter 1) provided an introduction to this PhD thesis, starting with a discussion of this research's academic background and the reason why its focus lies on China's PSFDI. Then, the chapter highlighted the existing research gap that needs further investigation. The research aims and associated objectives, along with the three research hypotheses to be subjected to empirical scrutiny, were also highlighted. Next, the chapter set out the boundaries of this research by outlining its main focus and purpose, and what falls outside the scope of the thesis. This led to the expected contribution to knowledge. The rest of the thesis is structured as follows.

Chapter 2 provides a detailed account of China's political and economic backgrounds and the developing trends of inward FDI in China. It offers an extensive overview of China's outstanding economic performance after implementing the 'Forty Years of

Reform and Opening-up Policies'. Next, the chapter weighs carefully the burgeoning trend of China's inward FDI by presenting several figures that encompass relevant data from various publicly available international databases. The concept of the FDI restrictiveness index that represents the way in which FDI measures are characterised and weighted is highlighted in the following section of this chapter. After that, the chapter examines the position, trends and structure of China's PSFDI in recent decades at the aggregate level by analysing the actual value, growth rate, the proportion of FDI flows to the producer services sub-sectors, and the number of contracts of PSFDI over the time period 1997 to 2017.

Chapter 3 critically reviews relevant theoretical and empirical literature on FDI, specifically in the context of PSFDI. The chapter delves into the definition of FDI and the development of multiple classification criteria of PSFDI. The locational factors of FDI are then discussed in detail through revisiting key FDI theories (such as monopolistic advantage theory, product life cycle theory, internationalisation theory, the eclectic theory of international production, and so on.), and then an assessment of the existing empirical studies related to PSFDI determinants is given. This chapter culminates in the formulation of the conceptual framework distilled from the critical review of relevant theoretical and empirical literature, which displays and justifies the three hypotheses to be tested empirically.

Chapter 4 presents the econometric framework applied in this research. The chapter begins with justifying the epistemological and ontological positioning of the study. It provides an explanation of the times series analysis used to test hypothesis 1 (H1) together with the concept of stationary time series and then goes on to discuss the knowledge of the unit root tests used in the empirical analysis. Given the importance of the Auto Regressive Distributed Lag (ARDL) bounds testing approach to cointegration, that is employed to test the H1 empirically, this approach and its benefits are covered in depth. The panel data analysis approach used to examine H2 and H3 is then explained in detail along with a thorough discussion of the diagnostic tests employed.

Chapter 5 presents and discusses the estimation results of the analysis carried out to ascertain the determinants of FDI and PSFDI in China at country aggregate, and provincial, sub-sectoral level, as framed by the three hypotheses forming the analytical framework. Each hypothesis will be tested sequentially as follows. First, time series cointegration techniques are used to test the difference, if any, in the factors affecting aggregate FDI and PSFDI, which forms the basis of ***Hypothesis 1***. In the following section, the determinants of aggregate FDI and PSFDI are investigated using provincial level panel data on an extended model specification (***Hypothesis 2***). Finally, based on the provincial-level panel data econometric analysis, the factors affecting PSFDI in the sub-sectors of the producer services industry are investigated (***Hypothesis 3***). This chapter concludes by offering a further discussion of the empirical findings, how they relate to previous evidence and by providing some closing remarks.

Chapter 6 discusses and summarises the pivotal findings of this PhD thesis, the policy implications flowing from the results and the contribution to knowledge drawn from empirical results evaluation. Furthermore, it highlights the limitations of the study and profitable avenues for further research. The chapter closes with the author's personal reflection on the remarkable journey undertaken while studying towards their PhD.

Chapter Two: China's political economy and trends in inward FDI with a focus on producer services FDI

2.1 Chapter Overview

As a high employment service category, the producer services industry (an important subset of the service-producing industries) constitutes a driving force for a country's industrial development. The growth of producer services is related to the efficiency of the economic system, its growth and structural modernisation, thereby playing a pivotal role in the upgrading and competitiveness improvement of a country's primary, secondary and tertiary sectors. Similarly, FDI is widely considered as a catalyst to economic growth. Before conducting an in-depth study of the determinants of FDI flows to China's producers services sector, this chapter provides a detailed introduction to China's political and economic background, and its trends in terms of inward FDI. Then, from a provincial level perspective, the position of FDI in China's producer services in recent decades is examined, and the trends and structure of producer services FDI in China discussed in detail.

2.2 Forty Years of Reform and Opening-up Policies

2.2.1 The logical evolution of China's great achievements in economic development

During the past 40 years of incessant implementation of reform and opening-up policies, China's economy has developed strongly, people's living standards have gradually improved, scientific and technological achievements have been remarkable, all of which have propelled China to become the world's second-largest economy. At the same time, during this period, the establishment of the socialist market economic system has played a crucial role, promoting the rational allocation of resources and enhancing the development of the national economy. As Xu et al. (2018, p. 71) stated, "*Thirty years of reform and opening-up policies in China prove that promoting domestic reform with opening-up policies can stimulate great socio-economic development in a short period of time*".

2.2.2 Antecedents of the modernisation reforms up to 1978

Prior to the famous meeting in which he announced the reform and opening-up policies, Comrade Deng Xiaoping had used the concept of reform on several occasions. For example, on September 17th, 1978, he advocated for all cadres to think independently, suggesting that irrational things can (should) be boldly reformed. On October 11th of the same year, he proposed that each economic sector should not only undergo significant reforms in technology but institutional and modernisation reforms. At the Central Working Conference held on 13 December 1978, Comrade Deng Xiaoping proposed to reform the unfavourable factors affecting the relations of production to ensure that the factors of production aligned with the needs of the country's economic development. As concluded by Cao and Li (2019), the success of the reform and opening-up policies can be attributed to many factors, including innovation in the overall system. In addition, the influx of FDI, the increase in domestic fixed-assets investment, the relatively stable exchange rate and increased foreign trade, have improved the domestic economic environment. There is no doubt that the increase in productivity driven by technological innovation has contributed greatly to this tremendous growth.

2.2.3 China's reform and 'opening up' policies from 1978 to the early 1990s

The Third Plenary Session of the Eleventh Central Committee, held in Beijing, China from the 18th to the 22nd of December 1978, opened the great course of China's reform and opening-up policies, marking a significant turning point in the history of the country and China's entry into a new era. As the name suggests, the reform and opening-up policies entail "reform" and "opening-up". In terms of the "reform", including economic system reform, the highly centralised, planned economic system has been replaced by (or 'reformed' to) a socialist *market* economic system. Moreover, the reform of the political system includes the development of democracy, the strengthening of the rule of law, the separation between government and enterprises, the streamlining of institutions, the improvement of the democratic supervision system as well as the maintenance of stability and unity. In terms of "opening-up", the term not only refers to opening-up to the outside world but also to opening-up to the inside, by granting greater autonomy and independence to the Chinese provinces. For example,

on 15 July 1979, the central government officially approved Guangdong and Fujian provinces to implement appropriate independent policies and flexible measures in foreign economic activities.

In 1979, the government also approved the establishment of Shenzhen and Xiamen as economic special areas. Subsequently, in 1980, two further economic special areas, Zhuhai and Shantou, were added. In 1984, 14 cities, including Tianjin, Shanghai and Dalian, were set up as coastal open cities to expand economic management autonomy. In February 1985, 51 counties in the Pearl River Delta, the Yangtze River Delta and the Minnan Delta, were further granted open coastal economic zones status. In March 1988, the coastal economic zones expanded to Liaodong and Shandong Peninsula, and the Hainan economic special area was established in April of the same year. Since 1991, 15 bonded zones have been established in critical coastal ports such as Shanghai Waigaoqiao, Shenzhen Futian, Shatoujiao and Tianjin Port, and the export processing and entrepot trade were encouraged. During this period, the government introduced many policies to encourage and develop foreign trade, and China's foreign trade policy replaced the previous import-substitution export orientation (Cai, 2018).

2.2.4 Xiaoping's 'Southern talks' of 1992 and further reforms to date

From January 12th to February 21st of 1992, Comrade Deng Xiaoping, the chief architect of China's modernisation agenda, visited several southern cities of China such as Wuchang, Shenzhen, Zhuhai, and Shanghai. This prestigious series of events, now generally referred to as the "Southern Talks", pushed China's reform and opening-up to a new stage. After the "Southern talks", China's openness continued to increase, also by strengthening economic cooperation with foreign countries. As Ploberger (2016, p. 77) observed, "*One of the most visible and fundamental changes which took place during that critical period of the reform process was that China's international economic cooperation underwent an essential transformation, from an almost autarkic state of self-sufficiency to becoming the second-largest host country for foreign direct investment*".

Facts have proven that China's reform and opening-up policies led to great success, helping raise the world status of China's economy and its level of international competitiveness. Nevertheless, room for further improvement must be acknowledged, particularly with respect to the problems of enhancing the hybrid socialist market economy, narrowing the gap between the rich and the poor and gradually achieving shared prosperity (so as to reduce inequality), combating the corruption of government officials, and governing the society's moral decline; problems that appear to have deepened after the implementation of the modernisation agenda.

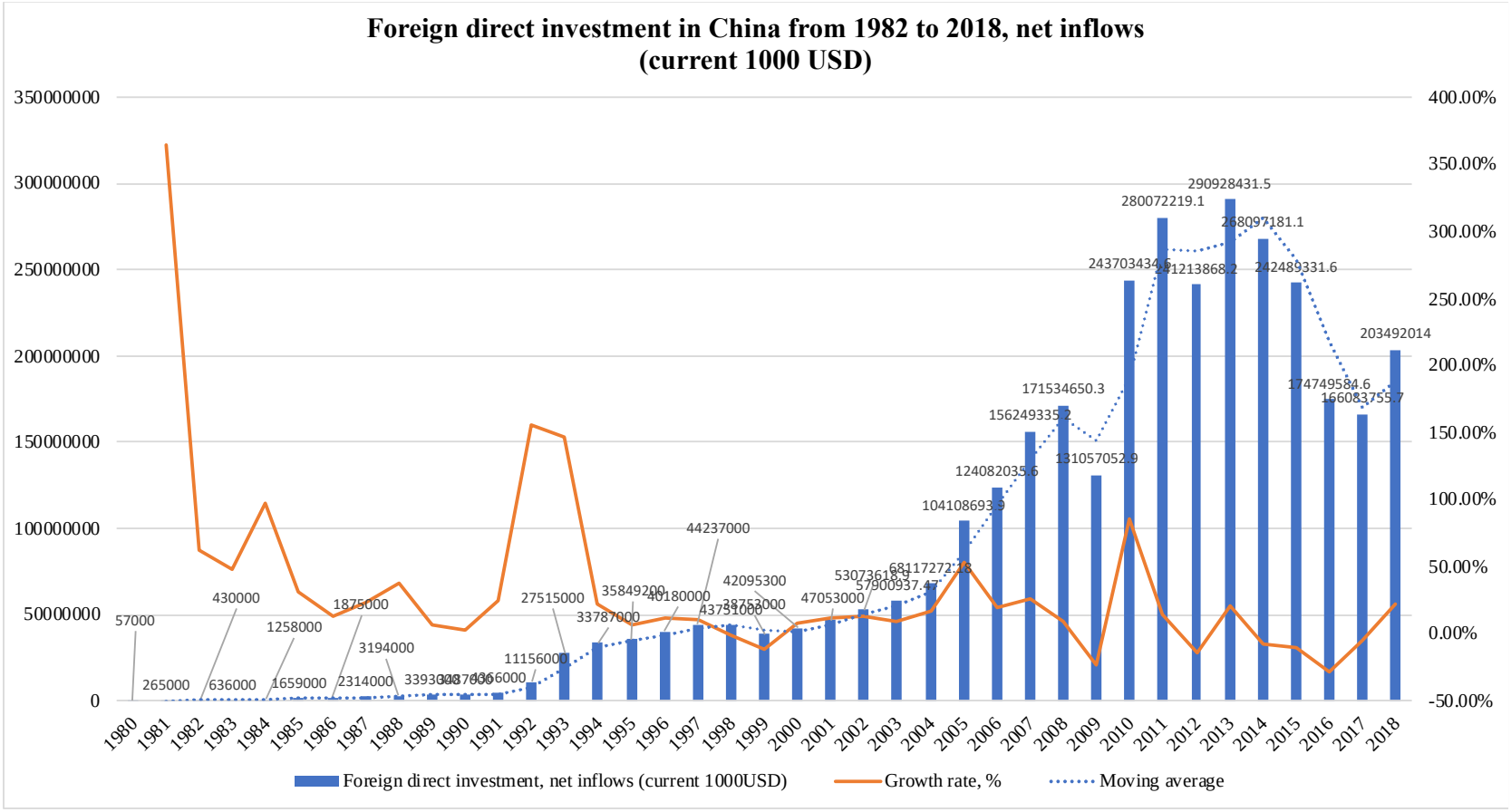
China's free trade zones refer to multi-functional special economic zones established outside customs jurisdiction within the territory of China, with preferential taxation and special customs supervision policies as the main means, and with trade liberalisation and facilitation as the main purpose (Ying and Fan, 2018). As international investment centres, free trade zones entail the use of preferential policies such as tax and foreign exchange used in the region to further attract foreign capital and introduce foreign advanced technology and management experience. Establishing free trade zones in ports, transportation hubs and border areas can play a critical role in increasing the prospering of ports and stimulating the development of transportation and logistics in the provinces.

Currently, the Chinese government has approved 12 free trade zones: Shanghai (established in 2013), Tianjin (established in 2015), Guangdong province (established in 2015), Fujian province (established in 2015), Liaoning (established in 2017), Zhejiang province (established in 2017), Henan province (established in 2017), Hubei province (established in 2017), Chongqing (established in 2017), Sichuan (established in 2017), Shanxi province (established in 2017) and Hainan (established in 2017).

2.3 Inward FDI in China

As far as the overall situation of FDI in China is concerned, from the 1980s to the beginning of the 21st century, China's FDI showed a slow-growth trend. Since the global financial crisis in 2008, China's net FDI inflows have experienced a short-term decline, followed by a rapid increase accompanied by some fluctuations.

Figure 2.1: FDI in China between 1980 and 2018, net inflows and growth rates



Source: Author's own calculations based on data from The World Bank (https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD)

Table 2.1: Value of FDI in China, net inflows and growth rates

Year	FDI, net inflows	Growth Rate	Year	FDI, net inflows	Growth Rate
1980	57000	-	2000	42095300	8.62%
1981	265000	364.91%	2001	47053000	11.78%
1982	430000	62.26%	2002	53073618.9	12.80%
1983	636000	47.91%	2003	57900937.5	9.10%
1984	1258000	97.80%	2004	68117272.2	17.64%
1985	1659000	31.88%	2005	104108694	52.84%
1986	1875000	13.02%	2006	124082036	19.19%
1987	2314000	23.41%	2007	156249335	25.92%
1988	3194000	38.03%	2008	171534650	9.78%
1989	3393000	6.23%	2009	131057053	-23.60%
1990	3487000	2.77%	2010	243703435	85.95%
1991	4366000	25.21%	2011	280072219	14.92%
1992	11156000	155.52%	2012	241213868	-13.87%
1993	27515000	146.64%	2013	290928431	20.61%
1994	33787000	22.79%	2014	268097181	-7.85%
1995	35849200	6.10%	2015	242489332	-9.55%
1996	40180000	12.08%	2016	174749585	-27.94%
1997	44237000	10.10%	2017	166083756	-4.96%
1998	43751000	-1.10%	2018	203492014	22.52%
1999	38753000	-11.42%			

Source: Author's own calculations based on data from The World Bank (https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD)

In the first ten years following the implementation of the economic reform and opening-up policies, China's openness did not increase significantly. Indeed, looking at China's FDI data (Figure 2.1 and Table 2.1), it can be seen that between 1980 and 1990, the value of Chinese inward FDI was very small, in the range between 25,000 and 3,487,000 thousand US dollars, and the growth rate displayed a decrease in volatility with a range from 2.77% to 364.91%. After 1990, the value of FDI in China rose steadily year by year, reaching a peak in 1997 at 4,4237,000 thousand US dollars, about 13 times the value of 1990. Since 2000, with the continuous expansion of the country's openness, the value of inward FDI in China increased rapidly, from 42,095,300 thousand US dollars in 2000 to 171,534,650 thousand US dollars in 2008. The growth

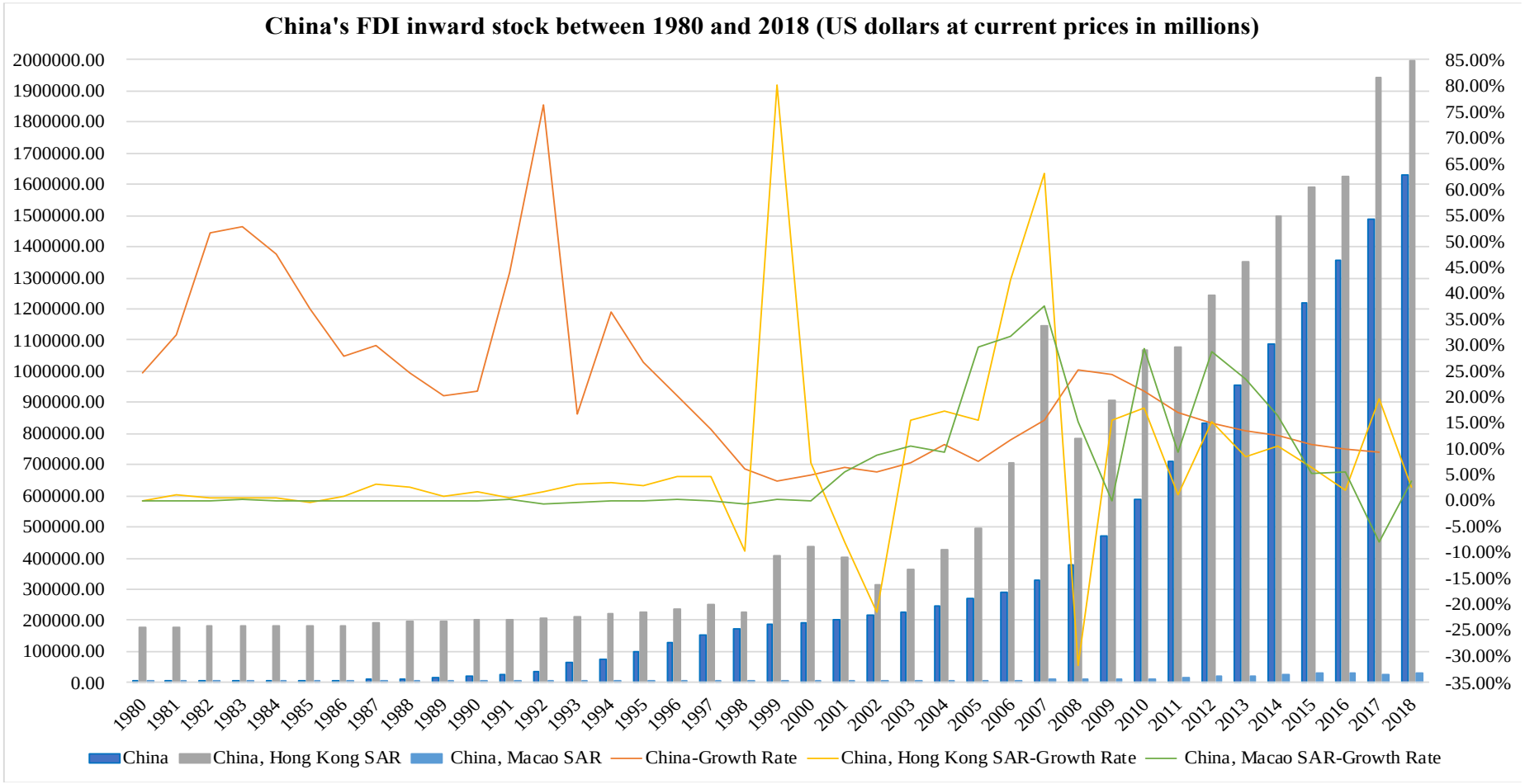
between 2004 and 2005 was particularly prominent, at 52.84%. However, the 2008 economic crisis swept the world, and the financial turmoil caused a negative growth in China's inward FDI for the first time (-23.60%). After 2010, aided by a series of policy measures, China's FDI net inflows grew at a rapid rate, reaching a peak of nearly 290,928,431 thousand US dollars in 2013, around 2.2 times the value of 2009. After that, inward FDI flows registered a series of declines, from 290,928,431 thousand US dollars in 2013 to 20,349,014 thousand US dollars in 2018, with a growth rate fluctuating between -27.94% and 22.52%.

The proportion of FDI to GDP is generally used as an indicator to measure the economic weight (or economic importance/contribution) of FDI. As shown in Figure 2.2, between 1980 and 1993, the proportion of China's FDI to GDP registered a trend of steady growth. The maximum value occurred in 1993, which was 618.89%. Especially between 1993 and 2004, the proportion decreased, from 618.89% to 348.36%. Since then, between 2005 and 2018, the proportion of China's inward FDI to GDP fluctuated. However, the overall trend has been declining, indicating that the contribution of Chinese domestic enterprises to the economy is increasing year by year relative to the rise in inward FDI.

Figure 2.2: FDI net inflows as a percentage of GDP in China between 1980 and 2018

Source: International Monetary Fund, International Financial Statistics and Balance of Payments databases, World Bank, International Debt Statistics, and World Bank and OECD GDP estimates.

Figure 2.3: FDI inward stock in China between 1980 and 2018



Source: Author's own calculations based on data from UNCTAD (https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx)

Table 2.2: FDI inward stock and annual growth rate in China between 1980 and 2018, million US dollars

YEAR	China	Growth Rate	China, Hong Kong SAR	Growth Rate	China, Macao SAR	Growth Rate
1980	1074.00	-	177755.32	-	2800.50	-
1981	1339.00	24.67%	179818.11	1.16%	2800.50	0.00%
1982	1769.00	32.11%	181054.96	0.69%	2800.76	0.01%
1983	2685.00	51.78%	182199.09	0.63%	2808.91	0.29%
1984	4104.00	52.85%	183486.83	0.71%	2808.91	0.00%
1985	6060.00	47.66%	183219.61	-0.15%	2808.53	-0.01%
1986	8303.73	37.03%	185107.92	1.03%	2808.58	0.00%
1987	10617.26	27.86%	191357.75	3.38%	2808.49	0.00%
1988	13810.94	30.08%	196336.70	2.60%	2808.84	0.01%
1989	17203.51	24.56%	198377.80	1.04%	2808.24	-0.02%
1990	20690.62	20.27%	201652.87	1.65%	2808.72	0.02%
1991	25056.96	21.10%	202673.73	0.51%	2819.44	0.38%
1992	36064.47	43.93%	206561.20	1.92%	2799.94	-0.69%
1993	63579.42	76.29%	213490.82	3.35%	2796.34	-0.13%
1994	74151.00	16.63%	221318.76	3.67%	2799.82	0.12%
1995	101098.00	36.34%	227532.12	2.81%	2802.01	0.08%
1996	128069.00	26.68%	237992.30	4.60%	2807.95	0.21%
1997	153995.00	20.24%	249360.44	4.78%	2810.26	0.08%
1998	175156.00	13.74%	225078.23	-9.74%	2792.37	-0.64%
1999	186189.00	6.30%	405265.99	80.06%	2801.79	0.34%
2000	193348.00	3.85%	435417.14	7.44%	2801.00	-0.03%

2001	203142.00	5.07%	401186.74	-7.86%	2960.84	5.71%
2002	216503.00	6.58%	315063.35	-21.47%	3221.32	8.80%
2003	228371.00	5.48%	363680.41	15.43%	3561.51	10.56%
2004	245467.00	7.49%	427052.42	17.43%	3891.48	9.27%
2005	272094.00	10.85%	493894.74	15.65%	5041.75	29.56%
2006	292559.00	7.52%	703563.19	42.45%	6636.86	31.64%
2007	327087.00	11.80%	1147889.25	63.15%	9126.85	37.52%
2008	378083.00	15.59%	783257.34	-31.77%	10532.80	15.40%
2009	473083.00	25.13%	904300.05	15.45%	10522.55	-0.10%
2010	587817.00	24.25%	1067519.97	18.05%	13602.63	29.27%
2011	711802.00	21.09%	1078748.82	1.05%	14899.12	9.53%
2012	832882.00	17.01%	1244646.28	15.38%	19203.41	28.89%
2013	956793.00	14.88%	1352021.67	8.63%	23723.14	23.54%
2014	1085293.00	13.43%	1496082.65	10.66%	27631.38	16.47%
2015	1220903.00	12.50%	1591627.38	6.39%	29116.29	5.37%
2016	1354613.00	10.95%	1626013.41	2.16%	30713.47	5.49%
2017	1488675.70	9.90%	1943917.07	19.55%	28244.86	-8.04%
2018	1627719.19	9.34%	1997220.45	2.74%	29307.99	3.76%

Source: Author’s own calculations based on data from UNCTAD

Figure 2.3 and Table 2.2 show the general trend and more detailed data of China's FDI stock from 1980 to 2018. Over the past 40 years, China's FDI stock has shown a steady growth year by year, from 1,074 million US dollars in 1980 to 1,627,719.19 million US dollars in 2018. In 1983, 1984, 1985, 1992 and 1993, China's FDI stock increased by nearly half, respectively 51.78%, 52.85%, 47.66%, 43.93% and 76.29%.

Compared with FDI stock in Hong Kong, mainland China is relatively stable, showing a small increase in growth, generally maintained at around 5%. Between 1980 and 2000, except for 1985 and 1998, FDI stock in Hong Kong fell by 0.15% and 9.74%. In other years, this value maintained steady growth, with the growth rate staying between 0.51% and 7.44%. The increase in 1998 reached 80%. Subsequently, the growth rate of FDI stock in Hong Kong, accelerated, especially in 2006 and 2007, when the growth rate reached 42.45% and 63.15%, respectively. However, as Hong Kong's economy was struck by the 2008 financial crisis, the value of FDI stock in that year fell by 31.77%, the most significant decline in nearly 40 years. From 2009 to 2018, this value continued to grow steadily, reaching 192,220.45 million US dollars in 2018.

Between 1980 and 2018, the value of FDI stock (inward) in Macao, grow steadily in general. Between 1980 and 2001, this value remained virtually unchanged, fluctuating between 2796.34 million US dollars and 2960.84 million US dollars. Beginning in 2001, the value of FDI stock (inward) began to increase slightly, from 2960.84 million US dollars in 2001 to 29307.99 million US dollars in 2018. The growth rate in 2007 and 2010 reached nearly one-third. The biggest dip occurred in 2017, at 8.04%.

Figure 2.4: The actual use of FDI in China by continents from 1997 to 2017

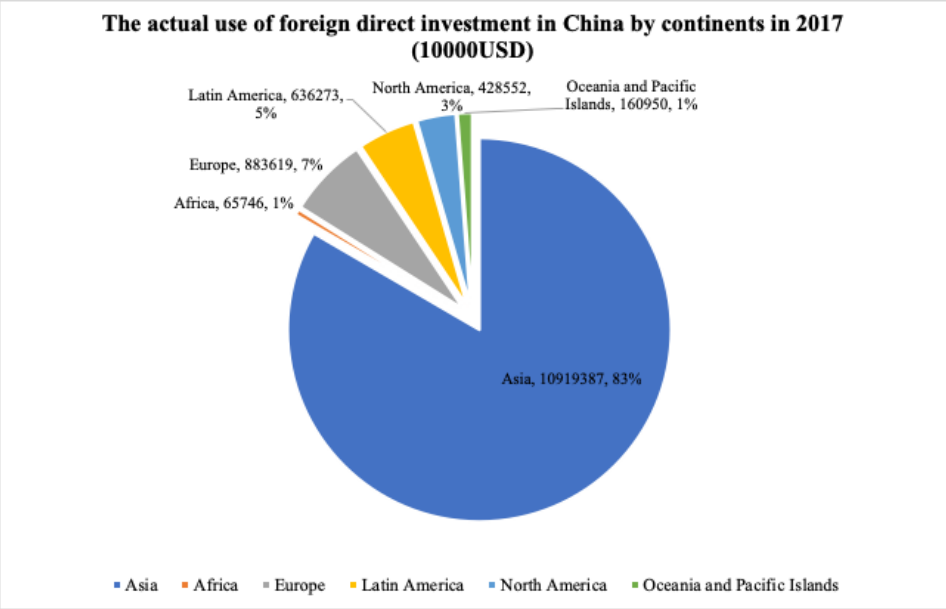
Source: Data used for Figure 2.2 is collected from China Statistical Yearbook

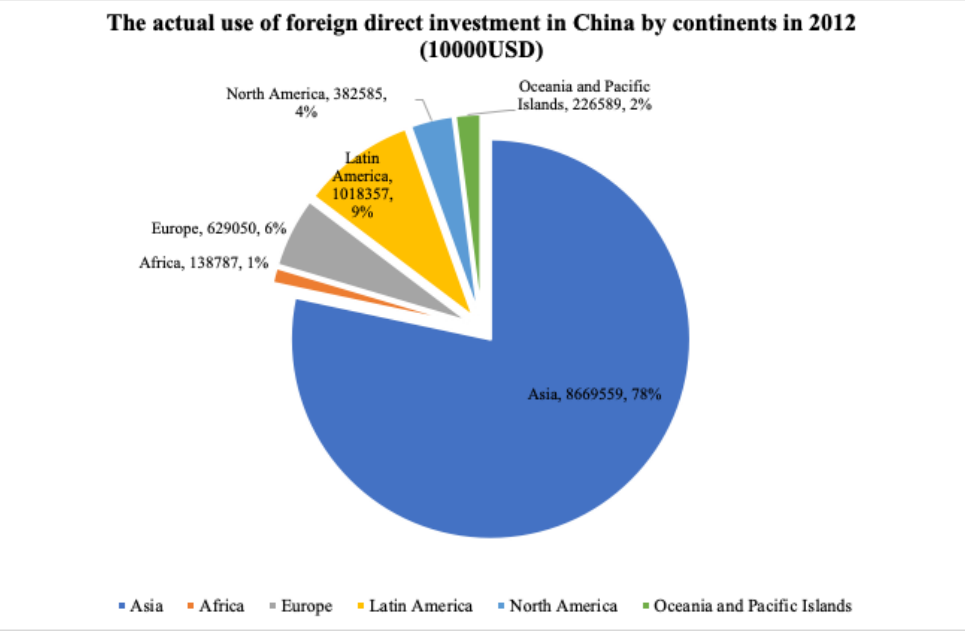
Table 2.3: Value of the actual use, annual growth rate of FDI in China by continents from 1997 to 2017

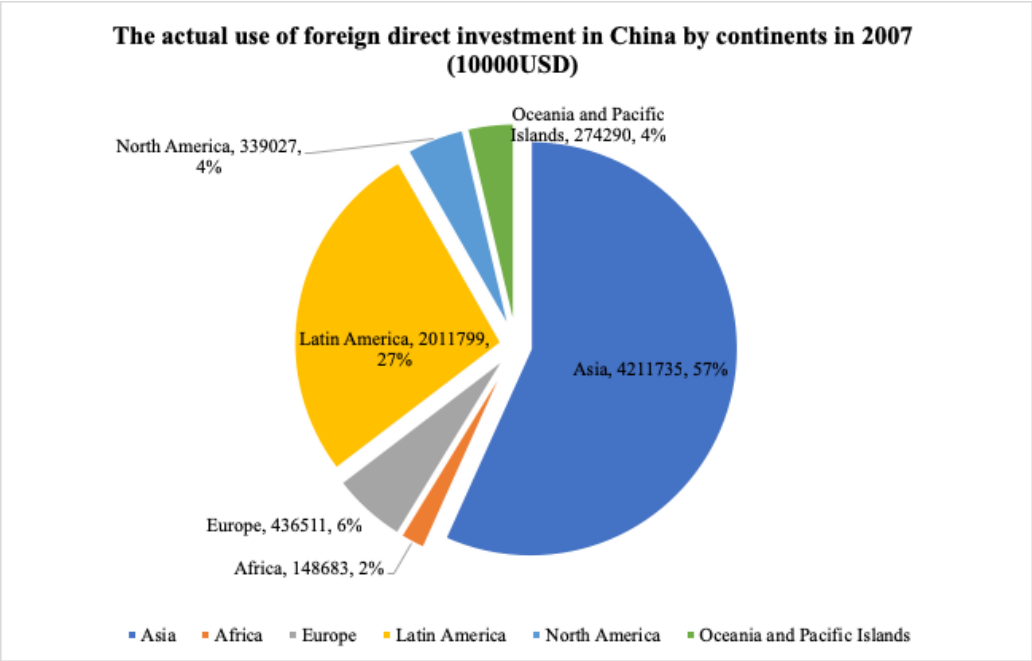
Year	Asia	Growth rate	Africa	Growth rate	Europe	Growth rate	Latin America	Growth rate	Year	North America	Growth rate	Oceania and Pacific Islands	Growth rate
1997	3427589	-	8237	-	443899	-	198139		**1997**	368816		58619	
1998	3133102	-8.59%	15876	92.74%	430933	-2.92%	456213	130.25%	**1998**	432943	17.39%	53369	-8.96%
1999	2683231	-14.36%	19606	23.49%	479713	11.32%	320447	-29.76%	**1999**	461608	6.62%	50920	-4.59%
2000	2548209	-5.03%	28771	46.75%	476539	-0.66%	461658	44.07%	**2000**	478579	3.68%	69403	36.30%
2001	2961326	16.21%	32977	14.62%	448398	-5.91%	630891	36.66%	**2001**	509685	6.50%	101478	46.22%
2002	3256997	9.98%	56462	71.22%	404891	-9.70%	755053	19.68%	**2002**	649032	27.34%	141722	39.66%
2003	3410169	4.70%	61776	9.41%	427197	5.51%	690657	-8.53%	**2003**	516135	-20.48%	173119	22.15%
2004	3761986	10.32%	77568	25.56%	479830	12.32%	904353	30.94%	**2004**	497759	-3.56%	197437	14.05%
2005	3571889	-5.05%	107086	38.05%	564310	17.61%	1129333	24.88%	**2005**	372996	-25.06%	199898	1.25%
2006	3508487	-1.78%	121735	13.68%	571156	1.21%	1416262	25.41%	**2006**	368699	-1.15%	226024	13.07%
2007	4211735	20.04%	148683	22.14%	436511	-23.57%	2011799	42.05%	**2007**	339027	-8.05%	274290	21.35%
2008	5634512	33.78%	166788	12.18%	545937	25.07%	2090344	3.90%	**2008**	395780	16.74%	316987	15.57%
2009	6062289	7.59%	130969	-21.48%	551771	1.07%	1468433	-29.75%	**2009**	367672	-7.10%	252877	-20.22%
2010	7759215	27.99%	127992	-2.27%	592183	7.32%	1352563	-7.89%	**2010**	401372	9.17%	232777	-7.95%
2011	8951427	15.37%	164091	28.20%	587654	-0.76%	1250460	-7.55%	**2011**	358156	-10.77%	261999	12.55%
2012	8669559	-3.15%	138787	-15.42%	629050	7.04%	1018357	-18.56%	**2012**	382585	6.82%	226589	-13.52%
2013	9467234	9.20%	137901	-0.64%	689319	9.58%	820687	-19.41%	**2013**	408372	6.74%	232652	2.68%
2014	9864918	4.20%	101926	-26.09%	669165	-2.92%	771545	-5.99%	**2014**	325619	-20.26%	189251	-18.65%
2015	10415946	5.59%	58507	-42.60%	689705	3.07%	913768	18.43%	**2015**	304272	-6.56%	244357	29.12%
2016	9883103	-5.12%	112720	92.66%	943439	36.79%	1221618	33.69%	**2016**	310421	2.02%	126794	-48.11%
2017	10919387	10.49%	65746	-41.67%	883619	-6.34%	636273	-47.92%	**2017**	428552	38.06%	160950	26.94%

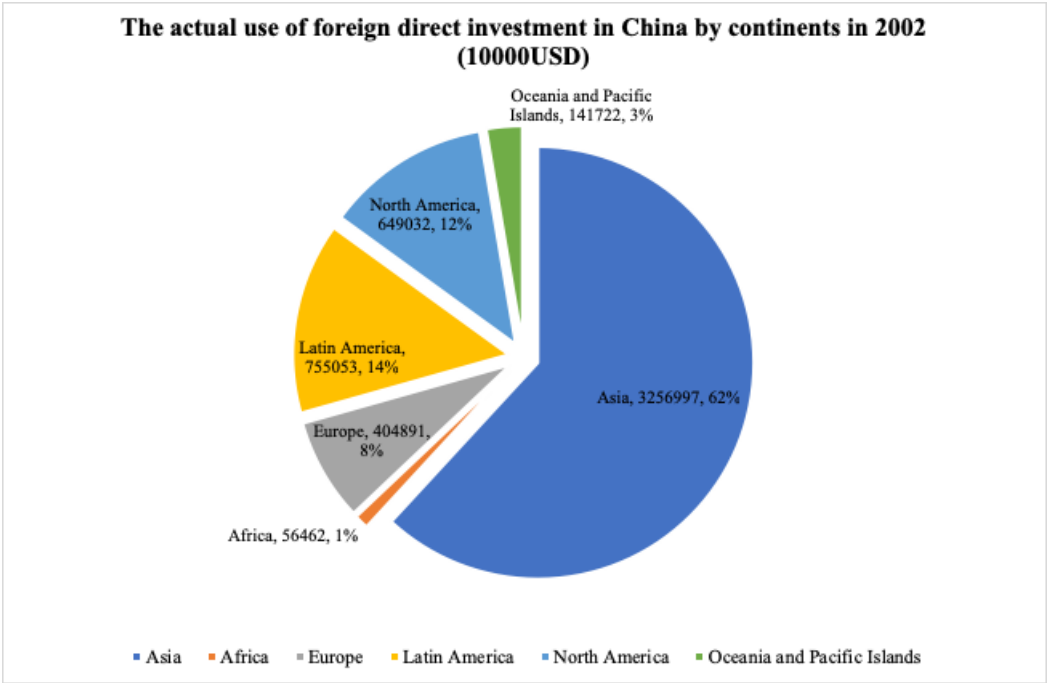
Source: Author's own calculations based on data from China Statistical Yearbook

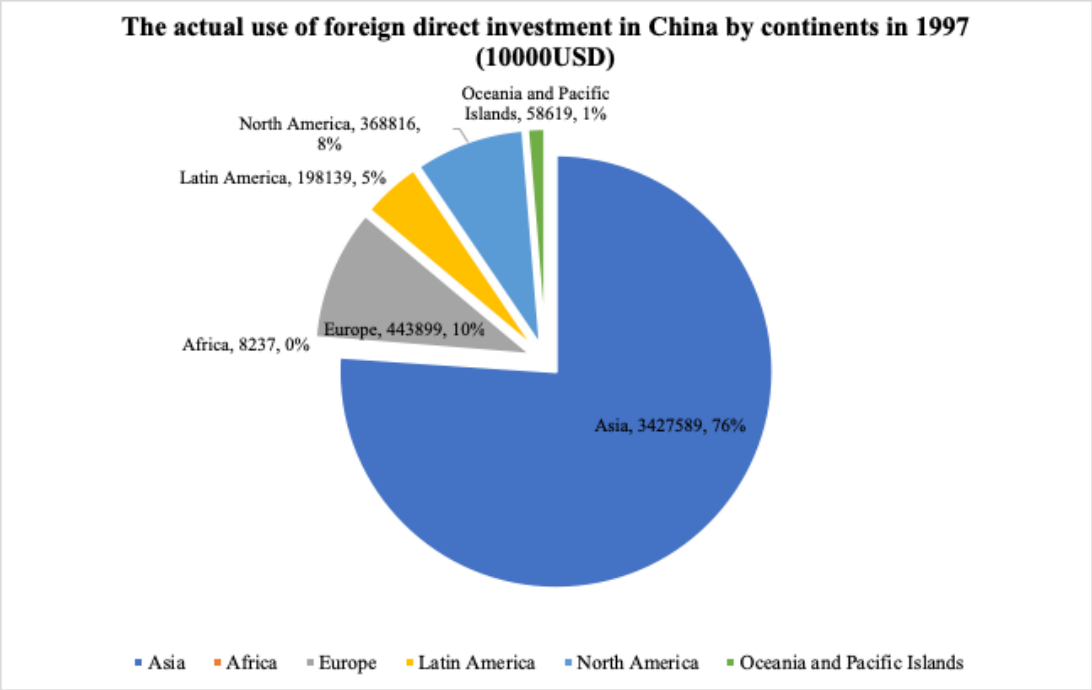
Figure 2.5: Value of the actual use, annual growth rate of FDI in China by continents in 2017, 2012, 2007, 2002 and 1997






The actual use of foreign direct investment in China by continents in 2007 (10000USD)
Oceania and Pacific Islands, 274290, 4%
North America, 339027, 4%
Latin America, 2011799, 27%
Asia, 4211735, 57%
Europe, 436511, 6%
Africa, 148683, 2%
Asia
Africa
Europe
Latin America
North America
Oceania and Pacific Islands


The actual use of foreign direct investment in China by continents in 2002 (10000USD)
Oceania and Pacific Islands, 141722, 3%
North America, 649032, 12%
Latin America, 755053, 14%
Asia, 3256997, 62%
Europe, 404891, 8%
Africa, 56462, 1%
Asia
Africa
Europe
Latin America
North America
Oceania and Pacific Islands



Source: Author's own calculations based on data from China Statistical Yearbook

Figure 2.4, Figure 2.5 and Table 2.3, with 'five years' as a time node, show the distribution of Chinese inward FDI from different continents from 1997 to 2017. As can be seen from the above figures, FDI from Asian countries accounted for the most significant proportion of inward FDI, floating between 2,548,209 and 10,919,387 million US dollars over the past two decades. Between 1998 and 2000, Chinese inward FDI recorded three years of negative growth, within a range between -8.59% and -14.26%. After 2001, FDI from Asian countries climbed year on year, reaching a small peak in 2004 of 3,761,986 million US dollars. 2007-2008 was a critical time, as China's FDI inflows from Asian countries achieved a maximum growth rate of 33.78% over the past 20 years. After 2008, with the support of a series of economic recovery policies, FDI from Asian countries steadily climbed, reaching its highest value (119.937 million US dollars) in 2017.

From 1997 to 2017, FDI from Latin American countries into China was the second-highest among FDI inflows from six continents. Interestingly, the value of FDI inflows from Latin America rose in volatility and then continued to decline. Between 1997 and 2003, despite some small reductions, the overall value still rose in volatility. The

upward trend that began after 2004 was relatively stable and continued into 2008, rising from 904,353 million US dollars to 2,011,799 million US dollars, with a stable growth rate ranging from 1.21% to 25.07%. Since 2009, this value has been decreasing in volatility, and this reduction has been maintained for ten years, from 2,090,334 million US dollars to 636,273 million US dollars.

In the time interval studied, compared with FDI flows to China from other continents, the proportion of FDI from Europe remained between 6% and 10%, basically maintaining the third place. Between 1997 and 2004, the value of China's FDI inflows from European countries remained stable in some fine-waves, ranging from 443,899 to 479,830 million US dollars, and the annual growth rate remained between -9.70% to 12.32%. This value showed a growth trend in 2005, and after two small reductions in 2007 and 2011, it began to grow steadily for ten years, with the growth rate, from -23.57% to 36.79%. It is worth highlighting that in 2016, China's inward FDI from European countries reached a 20-year peak, 943,439 million US dollars, an increase of nearly one-third compared to the value recorded in 2015.

Among the proportion of Chinese inward FDI from the six continents, China's FDI inflows from North America remained stable. In the five years from 1997 to 2005, the value enjoyed steady growth, from 368,816 million US dollars in 1997 to 649,032 million US dollars in 2002, with growth rates between 3.68% and 27.34%. However, this value saw a sharp drop in 2003, from 649,032 million US dollars in 2002 to 516,135 million US dollars, a decrease of 20.48%. FDI inflows from South America decreased year by year. After achieving a growth rate of 16.74% in 2008, this value kept decreasing year by year, until 2017, when there was a sharp increase reaching 428,552 million US dollars.

The proportion of FDI inflows from Oceania and the Pacific Islands has remained at around 1 to 4% compared with the other five continents, accounting for a relatively small proportion. Between 1997 and 2008, this value has been steadily rising, from 58,619 million US dollars to 315,987 million US dollars, reaching its peak in 2008. Among these increases the one from 2000 to 2003 was particularly prominent, floating between 22.15% and 46.22%. After the financial crisis in 2008, the value of China's

FDI from Oceania and the Pacific Islands decreased year by year, from 316,987 million US dollars to 126,794 million US dollars. The most significant decline occurred in 2016, a decrease of 48.11% from 2015. Then, there was a slight increase in 2017, which was a quarter of the 2016 increase.

In terms of FDI inflows from the six continents, China's inward FDI from African countries is the lowest. Between 1997 and 2008, this value rose steadily, from 8,237 million US dollars in 1997 to 16,678 million US dollars in 2008. The value doubled in 1998, with a recorded increase of 92.74%. But after 2008, this value decreased year by year, reaching a minimum in 2015, at 58,007 million US dollars. Since then, Chinese inward FDI from African countries doubled again in 2016, achieving a growth rate of 92.66%, and then reduced to nearly 65,746 million US dollars in 2017, a decrease of nearly one-half.

2.4 The way in which FDI measures are scored and weighted (FDI Restrictiveness Index)

The government's fear of risk or the lack of self-confidence in its regulatory capacity and its lack of openness may generate considerable risks and cause the country to lose its place in global value chains. Since the reform and opening-up policy in 1978,[1] China introduced many measures to encourage FDI. Many people think that China has promoted its economic development by allowing foreign capital and reducing entry barriers. However, the literature often overlooks how high the barriers China had in attracting FDI were, not only before the modernization agenda but also during the transition period. In fact, before 2008, China's many preferential policies for FDI and many access restrictions, co-existed. In 2008, China implemented a merger of two taxes and unified the tax treatment of foreign and domestic capital. At present, most of the foreign special preferential treatment has faded out, creating a consistent competitive environment for domestic and foreign investors. However, in terms of access restrictions, the opening-up measures have stagnated since 2006. The reason is that

[1] "In 1978, China began to adopt the policy of internal reform and external opening-up. Now, it has generally transformed itself from a closed and central-planned economy to a market-oriented economy that is connected to the world, with its annual economic growth maintaining at a high rate of nearly 10%" (Ding and Li, 2014, p. 377).

China's preferential foreign investment has disappeared, access restrictions have existed in large numbers, foreign capital did not perfectly flow in the upstream and downstream of the value chain, and labour costs continued to rise, leading to a stagnant level of foreign capital inflows. In the context of China's inward FDI flows in recent years, there have been more and more concerns about China's excessive investment barriers to FDI.

In 2003, the OECD Investment Bureau and the Ministry of Economic Affairs jointly developed the FDI restrictiveness index database (Koyama and Golub, 2006). The FDI restrictiveness index includes the scores of four measures: (i) restrictions on foreign equity; (ii) prior approval requirements; (iii) rules for crucial personnel; (iv) other restrictions on the operation of foreign companies. Restrictions on foreign equity create an obstacle to FDI. Many countries still adopt this measure, especially in their service industry. There are three contexts in which foreign equity restrictions are scored: full restrictions on foreign investment, majority equity restrictions, and restrictions on foreign ownership. These three types are also the most common restrictive measures in legislation. If FDI is not allowed, the sector is completely closed to the outside world, and the score will be 1. If FDI is subject to a majority equity restriction, the score is 0.5. If the requirement of a minimum domestic holding is imposed, the score is 0.25.

Pre-approval: The scope of the pre-approval requirements is very broad. Also, the FDI restrictiveness index rating mainly focuses on regulatory restrictions, such as the review of FDI and foreign equity share threshold. If the highest pre-approval requirements are obtained, the score will be 0.2.

Restrictions on key foreign personnel: Restrictions on key foreign personnel (such as directors and managers) include employment of foreign managers, employment time limits for foreign managers, and nationality requirements for board members.

Other restrictions: Other restrictions on the operation of foreign-funded enterprises include restrictions on branches, purchasing land for business purposes (including foreigners who cannot own land but can lease), reciprocal terms of specific industries, restrictions on repatriation of profits or capital returns to the home country, and so on.

The total score of restrictive measures: The highest score for any department or measure is 1 (that is, the department that completely restricts FDI), and the lowest score is 0 (that is, there is no regulatory restriction on FDI).

The FDI restrictiveness index for each department/sector is the sum of the scores of the above four measures. This index covers 22 industries, summarising the average scores of each industry as a score for a country's FDI restrictiveness index.

"FDI restrictiveness is an OECD index gauging the restrictiveness of a country's foreign direct investment (FDI) rules by looking at four main types of restrictions: foreign equity restrictions; discriminatory screening or approval mechanisms; restrictions on key foreign personnel and operational restrictions. Implementation issues are not addressed and factors such as the degree of transparency or discretion in granting approvals are not taken into account. The index here shows the total and nine component sectors taking values between 0 for open and 1 for closed." (OECD, 2010, p. 5)

Figure 2.6: The trend of G20 countries' OECD FDI regulatory restrictiveness index

Source: OECD International Direct Investment Statistics

Figure 2.7: G20 countries' OECD FDI regulatory restrictiveness index

Source: OECD International Direct Investment Statistics

Table 2.4: The value of FDI restrictiveness of G20 countries between 1980 and 2018

Source: OECD International Direct Investment Statistics

First, let us look at the G20 countries' total FDI restrictiveness index, as shown in Figures 2.5 and 2.6 and Table 2.4. As for the general trend, since 1997, China's foreign investment restrictions are relatively high; the country with the highest FDI restriction index among the G20 countries. Between 1997 and 2003, with the deepening implementation of China's opening-up policy, the FDI restrictiveness index fell from 0.613 to 0.567, indicating that China's FDI restrictions have decreased. It is worth noting that the most significant decline in the FDI restrictiveness index occurred between 2003 and 2006, from 0.567 to 0.459. From 2006 to 2014, China's FDI restrictiveness index did not change significantly, and the fluctuation range did not exceed 0.032. Between 2015 and 2016, China implemented several measures to improve the degree of openness and attract more foreign investment. China's FDI restrictiveness index fell sharply from 0.422 in 2014 to 0.335 in 2016. In 2017 and 2018, with the further increase in China's openness, the degree of FDI restrictions dropped significantly, down by 0.066.

Figure 2.8: China's FDI Regulatory Restrictiveness Index in Primary industry from 1997 and 2018

Source: OECD International Direct Investment Statistics

(https://stats.oecd.org/Index.aspx?datasetcode=FDIINDEX#)

As shown in Figure 2.8 and Table 2.5, between 1997 and 2018, China's primary industry FDI restrictiveness index showed a general downward trend, from 0.665 to 0.358. From a sectoral perspective, China has the highest level of FDI restrictions in the fisheries sector. Except for the FDI restrictiveness index of 0.75 in 1997, this indicator has remained at one (the maximum value) until 2018, indicating the absolute rigour of China's blockage of FDI in fisheries. The decline rate of the FDI limit factor in the agricultural sector is also very significant, from 0.83 in 1997 to 0.34 in 2012. For the next four years, the indicator remained at 0.34. Since 2014, the restrictiveness index of FDI in the agricultural sector reduced by a small amount year by year and dropped to 0.185 in 2018, indicating that China has continuously liberalised the introduction of FDI in agriculture. Compared with other sectors in the primary industry, the FDI restrictiveness index of the forestry sector has remained at a minimum, from 0.55 in 1997 to 0.3 in 2003. Since then, between 2006 and 2015, this indicator reduced year by year until 2015, to 0.15. Between 2016 and 2018, the FDI restrictiveness index of the forestry sector remained at 0.05, still the lowest level.

Figure 2.9: China's FDI Regulatory Restrictiveness Index in Secondary industry from 1997 and 2018

Source: OECD International Direct Investment Statistics (https://stats.oecd.org/Index.aspx?datasetcode=FDIINDEX#)

Compared with the primary industry, the FDI restrictiveness index of China's secondary industry was relatively low between 1997 and 2018. The FDI restrictiveness index of the electronic distribution sector remained at 1 (the highest level) from 1997 to 2006, indicating that during this period, China completely blocked FDI in this sector. Between 2006 and 2010, the indicator fell rapidly, from 1 to 0.75, and then remained at the same level until 2017. The FDI restrictiveness index of the electronic distribution sector dropped extremely rapidly in 2018, a decrease of nearly 0.6. The index of the transportation equipment sector ranks third, dropping rapidly from 0.625 in 1997 to 0.41 in 2010. In the following four years, the indicator remained at 0.41, reaching its lowest point in 2018, at 0.12. The FDI restrictiveness index for the oil sector remained at the lowest level, from 0.288 in 1997 to 0.212 in 2006, and at 0.192 from 2010 to 2014. After that, this indicator dropped significantly, to 0.06 in 2018, which shows that the government released the restrictions on attracting foreign capital in this sector.

Figure 2.10: China's FDI Regulatory Restrictiveness Index in Tertiary industry from 1997 and 2018

Source: OECD International Direct Investment Statistics (https://stats.oecd.org/Index.aspx?datasetcode=FDIINDEX#)

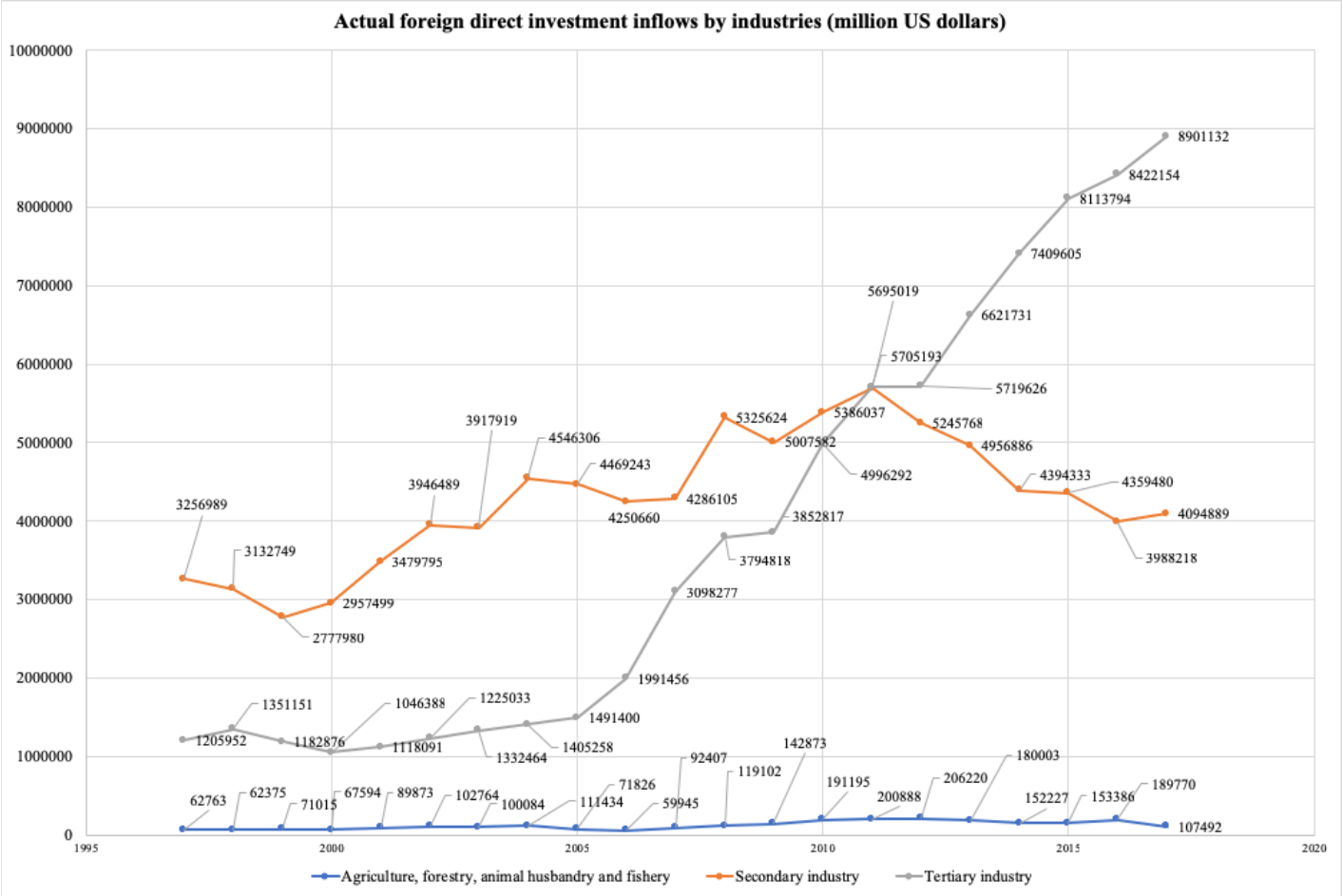
Table 2.5: China's FDI restrictiveness by industries between 1997 and 2018

Source: OECD International Direct Investment Statistics (https://stats.oecd.org/Index.aspx?datasetcode=FDIINDEX#)

The rapid growth of international service trade and services FDI has become increasingly significant for the national economies and foreign economic exchanges. In this context, many nations are paying increasing attention to the choice and system construction of international service foreign investment introduction policies. Due to the complexity of the services industry, the protection of domestic service industries by governments is often in the form of tariff barriers. It can only take the form of non-tariff barriers such as restrictions on market access or non-tariff treatment after the foreign investment enters the market. Therefore, it is important to discuss the services FDI restrictiveness index for the study of national policy instruments and measures for attracting FDI.

In past decades, the FDI restrictiveness index of the tertiary industry was the highest, indicating that the state imposed the highest level of restrictions on inward FDI in this industry, and a very low degree of openness. Overall, between 1997 and 2018, this index has steadily decreased year by year, from 0.716 in 1997 to 0.316 in 2018, but it is still the industry with the highest restrictions on FDI among the three industries. From a departmental perspective, China's FDI restrictiveness index in the media, radio and TV broadcasting and other media sectors remained between 0.985 and 1, indicating that the country is sharply restricting FDI into these areas. China's FDI restrictiveness index for communications, fixed telecoms and mobile telecoms are relatively high, staying in the range of 0.75 to 1. Between 2003 and 2006, the openness of many sectors in the service industry was significantly liberalised, which is reflected in the significant reduction in the FDI restrictiveness index, such as in the distribution, wholesale and retail sectors, with corresponding decreases of 0.41, 0.5 and 0.36, respectively. The FDI restrictiveness index of the air sector has shown a rebound after a small decrease, from 0.775 in 1997 to 0.66 in 2015, and in the following three years it rose, up to 0.75 in 2018. For segments of the financial service sector such as banking, insurance, business services, accounting and other financial services, the index showed the same trend, steadily decreasing between 1997 and 2018, with the banking industry's index falling the most, decreasing to 0.575. On the contrary, the FDI restrictiveness index of the legal sector rose from 0.65 in 1997 to 0.75 in 2018, indicating that China’s FDI restrictions in this sector have not been liberalised. China had earlier liberalised restrictions on inward FDI in the engineering sector, and here it always maintained a low FDI restrictiveness index of 0.05.

Figure 2.11: Actual FDI inflows by industries (million US dollars) between 1997 and 2017



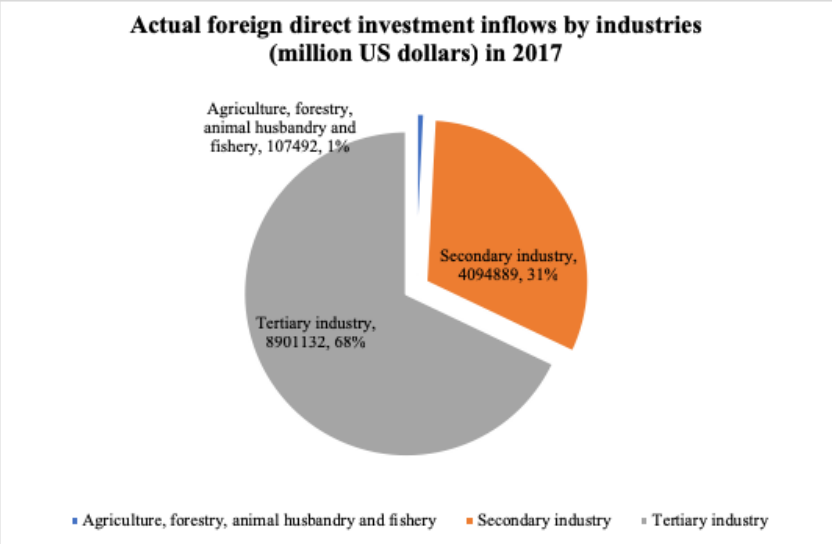
Source: Author's own calculations based on data from China Statistical Yearbook

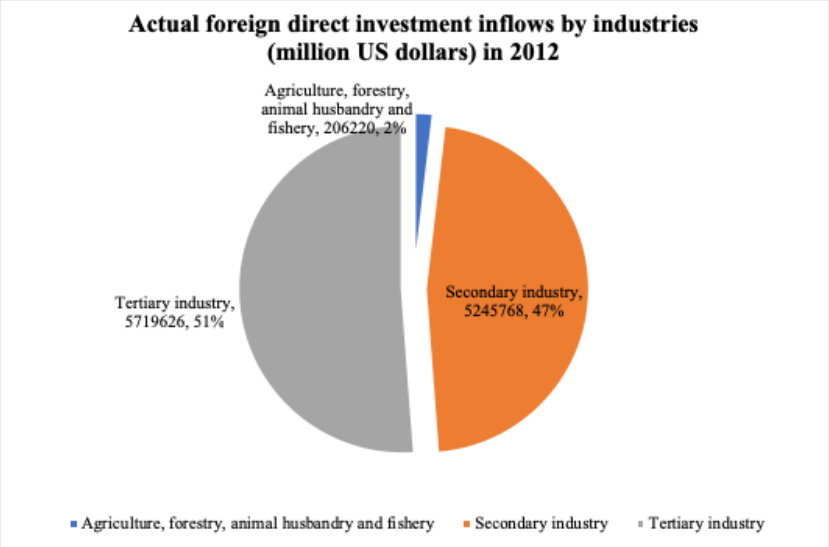
Table 2.6: Actual FDI inflows and annual growth rate by industries (million US dollars) between 1997 and 2017

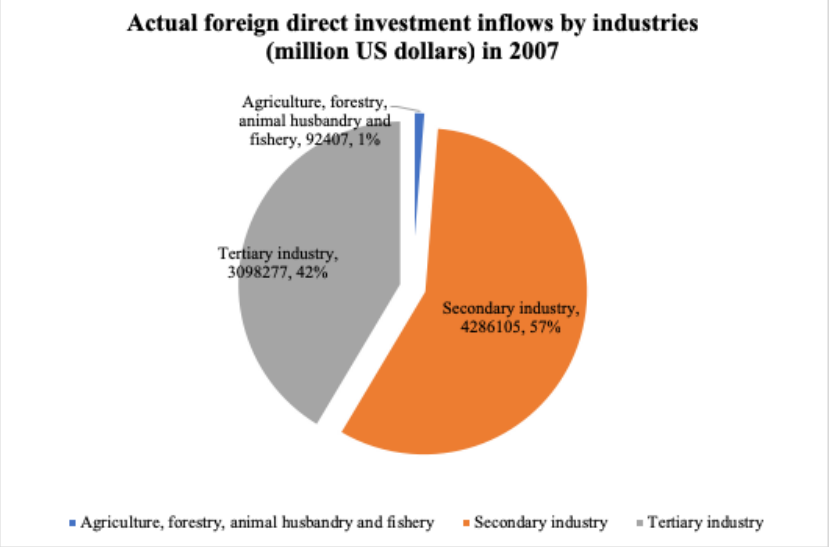
Year	Agriculture, forestry, animal husbandry and fishery	Growth rate	Secondary industry	Growth rate	Tertiary industry	Growth rate
1997	62763	-	3256989	-	1205952	-
1998	62375	-0.62%	3132749	-3.81%	1351151	12.04%
1999	71015	13.85%	2777980	-11.32%	1182876	-12.45%
2000	67594	-4.82%	2957499	6.46%	1046388	-11.54%
2001	89873	32.96%	3479795	17.66%	1118091	6.85%
2002	102764	14.34%	3946489	13.41%	1225033	9.56%
2003	100084	-2.61%	3917919	-0.72%	1332464	8.77%
2004	111434	11.34%	4546306	16.04%	1405258	5.46%
2005	71826	-35.54%	4469243	-1.70%	1491400	6.13%
2006	59945	-16.54%	4250660	-4.89%	1991456	33.53%
2007	92407	54.15%	4286105	0.83%	3098277	55.58%
2008	119102	28.89%	5325624	24.25%	3794818	22.48%
2009	142873	19.96%	5007582	-5.97%	3852817	1.53%
2010	191195	33.82%	5386037	7.56%	4996292	29.68%
2011	200888	5.07%	5695019	5.74%	5705193	14.19%
2012	206220	2.65%	5245768	-7.89%	5719626	0.25%
2013	180003	-12.71%	4956886	-5.51%	6621731	15.77%
2014	152227	-15.43%	4394333	-11.35%	7409605	11.90%
2015	153386	0.76%	4359480	-0.79%	8113794	9.50%
2016	189770	23.72%	3988218	-8.52%	8422154	3.80%
2017	107492	-43.36%	4094889	2.67%	8901132	5.69%

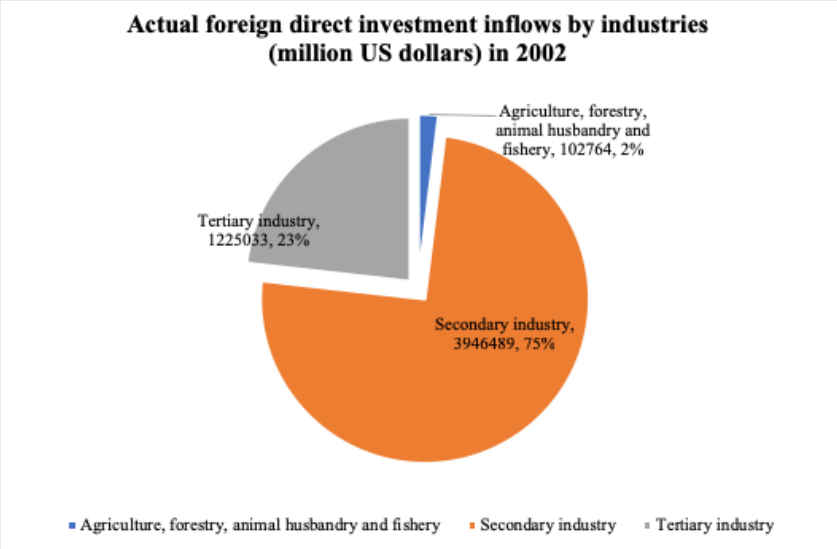
Source: Author's own calculations based on data from China Statistical Yearbook

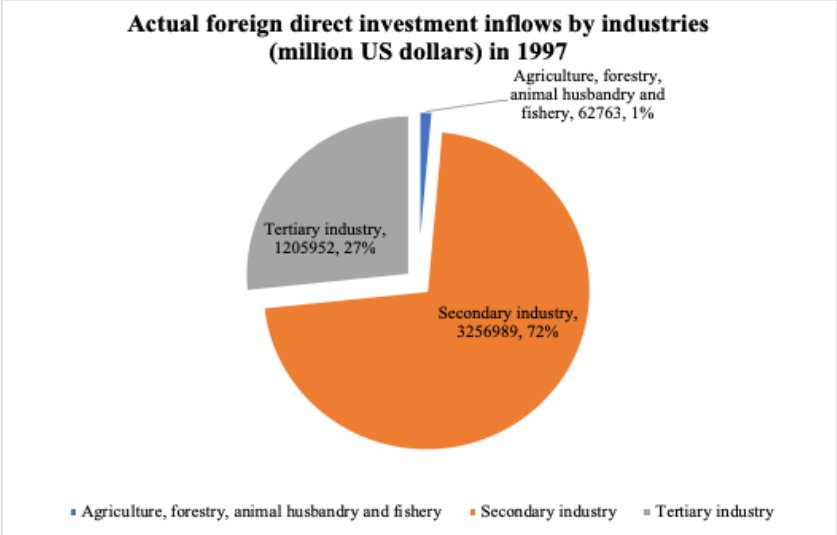
Figure 2.12: Value of the actual use, annual growth rate of FDI in China by industries in 2017, 2012, 2007, 2002 and 1997











Source: Author's own calculations based on data from China Statistical Yearbook

From the perspective of the industry distribution of FDI inflows, FDI flows to the secondary industry used to rank first, accounting for around 75%, followed by the tertiary industry, accounting for about 23%, and then the primary industry, at about 2%. Yet, this distribution has undergone tremendous change. The proportion of FDI flowing into the tertiary industry has been increasing, gradually surpassing the proportion of FDI flows into the secondary industry, while the FDI inflow ratio of the primary industry is still small.

In general, the proportion of China's FDI into the secondary industry has increased first and then decreased. From 1997 to 2011, the value of FDI flows to the secondary industry has risen slightly with some small declines. The proportion of FDI in the secondary industry has increased year by year, from 3,256,989 million US dollars in 1997 to 5,695,019 million US dollars in 2011. Among these increases, the growth rates in 2001 and 2008 were the most significant, 17.66% and 24.25%, respectively. Subsequently, starting in 2011, the value of FDI into the secondary industry has gradually decreased, from 5,695,019 million US dollars in 2011 to 4,094,889 million US dollars in 2017.

The proportion of FDI into the tertiary industry has increased year by year, indicating that the country has gradually liberalised inward FDI. As shown in Figure 2.7, in the five years observed, namely 1997, 2002, 2007, 2012 and 2017, the proportion of FDI in the tertiary industry increased year by year, with growth rates of 27%, 23%, 32%, 51% and 68%, respectively. The data of Figure 2.5 show that between 1997 and 2006, FDI flows to the tertiary industry experienced an overall growth trend, with values ranging from 1,046,388 to 1,991,456 million US dollars. Between 1998 and 2006, there were small decreases, with declines of about 12%. Since 2007, FDI flows to the tertiary industry have risen rapidly, peaking in 2017 at 8,901,132 million US dollars. Historically, the most substantial increase in FDI flows to the tertiary industry occurred in 2007, with a growth rate of 55%.

Through the observation of the above figures, tables and the FDI restriction index, the following conclusions can be reached. First, China's restrictions on inward FDI in the secondary industry have greatly expanded, while the restrictions on inward FDI in the

tertiary industry have continuously strengthened. Second, due to the historical development of China's secondary industry, and its original competitiveness, it gradually liberalised the restrictions. The development of the labour-intensive industries started first, followed by the technology-intensive industries. Third, China's tertiary industry started late, it is in many ways an emerging industry, so it is no surprise that it is lagging behind other countries in terms of development. It needs to strengthen supervision and protection so that it can reasonably absorb FDI and enjoy healthy development. Fourth, with respect to the future inward FDI policy, as the development of the tertiary industry is still in its infancy, in the next few years, China's tertiary industry will most likely become the vital sector for inward FDI policy restrictions. It is expected that with the development of the tertiary industry, the restrictions on the tertiary industry will gradually be lifted. Due to the upgrading of the industrial structure, survival of the fittest is needed, and since further restrictions on the secondary industry will be lifted, it can safely be expected that the leading sector of FDI inflows in the future will be the secondary industry[2].

2.5 Trends in producer services FDI

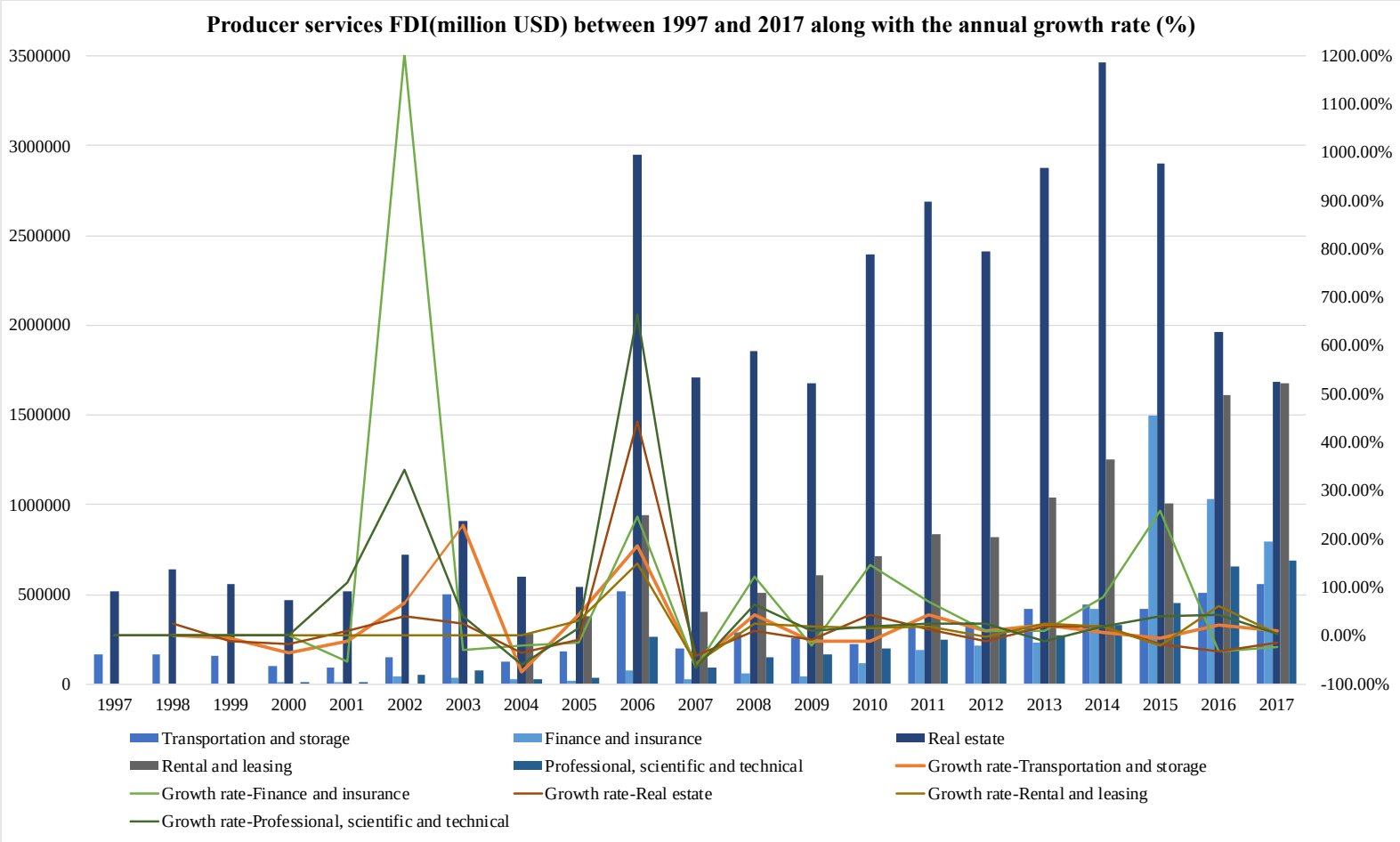
With the continuous strengthening of global economic integration, the continuous improvement of China's degree of openness, coupled with China's vast market space and conducive policy environment, as well as more and more mature industrial support, China's absorption and utilisation of FDI continue to expand. In terms of the scale of foreign capital utilisation, the actual use of FDI in China surpassed that of the United States in 2014, becoming the world's largest inward FDI country.

The use of foreign capital in China's service industry has exceeded the scale of manufacturing FDI. However, a critical problem facing the opening-up of China's services industry is that the structure is unbalanced and the technological content is not high. There are two significant shortcomings in the production services industry and high-tech service industry. FDI in the services industry is concentrated too much on

[2]According to Alshehhi and Oláh (2017, p. 40), by definition, "The secondary sector includes four economic activities (sectors or industries) and these are: mining and quarrying, manufacturing industries, electricity, gas and water, and construction, where these activities essentially transform raw materials to physical goods (or production of goods)".

non-traditional service industries with higher profits such as real estate, indicating that the structure of foreign investment in China's service industry needs to be optimised and upgraded. In terms of the producer services sector, the state further liberalised market access, reduced pre-approval, and accelerated cross-border E-commerce pilot construction. Government agencies have also expanded the scale of the guarantee business of producer services by improving the relevant tax system and encouraging financing guarantee institutions.

Figure 2.13: Producer services FDI (million USD) between 1997 and 2017 along with the annual growth rate (%)



Source: Author's own calculations based on data from China Statistical Yearbook 2008, 2013 and 2018

Table 2.6: The value of producer services FDI (million USD) between 1997 and 2017 along with the annual growth rate (%)

	Transportation and storage	Growth rate	Finance and insurance	Growth rate	Real estate	Growth rate
1997	165513	-	-		516901	-
1998	164513	-0.60%	-	0.00%	641006	24.01%
1999	155114	-5.71%	-	0.00%	558831	-12.82%
2000	101188	-34.77%	7629	0.00%	465751	-16.66%
2001	90890	-10.18%	3527	-53.77%	513655	10.29%
2002	152902	68.23%	46002	1204.28%	721713	40.51%
2003	501475	227.97%	31880	-30.70%	910568	26.17%
2004	127285	-74.62%	25248	-20.80%	595015	-34.65%
2005	181230	42.38%	21969	-12.99%	541807	-8.94%
2006	517422	185.51%	75972	245.81%	2946928	443.91%
2007	200676	-61.22%	25729	-66.13%	1708873	-42.01%
2008	285131	42.09%	57255	122.53%	1858995	8.78%
2009	252728	-11.36%	45617	-20.33%	1679619	-9.65%
2010	224373	-11.22%	112347	146.28%	2398556	42.80%
2011	319079	42.21%	190970	69.98%	2688152	12.07%
2012	347376	8.87%	211945	10.98%	2412487	-10.25%
2013	421738	21.41%	233046	9.96%	2879807	19.37%
2014	445559	5.65%	418216	79.46%	3462611	20.24%
2015	418607	-6.05%	1496889	257.92%	2899484	-16.26%
2016	508944	21.58%	1028901	-31.26%	1965528	-32.21%
2017	558803	9.80%	792119	-23.01%	1685559	-14.24%

	Rental and leasing	Growth rate	Professional, scientific and technical	Growth rate
1997	-	0.00%	-	0.00%
1998	-	0.00%	-	0.00%
1999	-	0.00%	-	0.00%
2000	-	0.00%	5703	0.00%
2001	-	0.00%	12044	111.19%
2002	-	0.00%	53365	343.08%
2003	-	0.00%	75306	41.11%
2004	282423	0.00%	29384	-60.98%
2005	374507	32.60%	34041	15.85%
2006	938762	150.67%	260234	664.47%
2007	401881	-57.19%	91668	-64.77%
2008	505884	25.88%	150555	64.24%
2009	607806	20.15%	167363	11.16%
2010	713023	17.31%	196692	17.52%
2011	838247	17.56%	245781	24.96%
2012	821105	-2.04%	309554	25.95%
2013	1036158	26.19%	275026	-11.15%
2014	1248588	20.50%	325466	18.34%
2015	1004973	-19.51%	452936	39.17%
2016	1613171	60.52%	651989	43.95%
2017	1673855	3.76%	684373	4.97%

Source: Author's own calculations based on data from China Statistical Yearbook 2008, 2013 and 2018

Overall, FDI in the ‘real estate’ sector has always dominated. Between 1997 and 2005, FDI flows into the ‘real estate’ sector showed a slight fluctuation trend, first increased slightly, followed by a small decrease, and then repeated. The value of FDI ranged from 465,751 to 910,568 million US dollars. Among them, the largest and lowest growth rates of the real estate sector appeared from 2001 to 2002 and 2003 to 2004, 40.51% and -34.65%, respectively. It is worth noting that most pronounced growth rate of the real estate sector in the past 20 years occurred in 2006, 443.91%, followed by a rapid decline in 2007, a decrease of 42.01%. After that, FDI in the real estate industry increased year by year, though still experiencing some fluctuations and reaching a peak in 2014 at 1,248, 588 million US dollars. Subsequently, this indicator showed a four-year decline, reaching 1,678,355 in 2017, which is the same as the figures for 2007 and 2009.

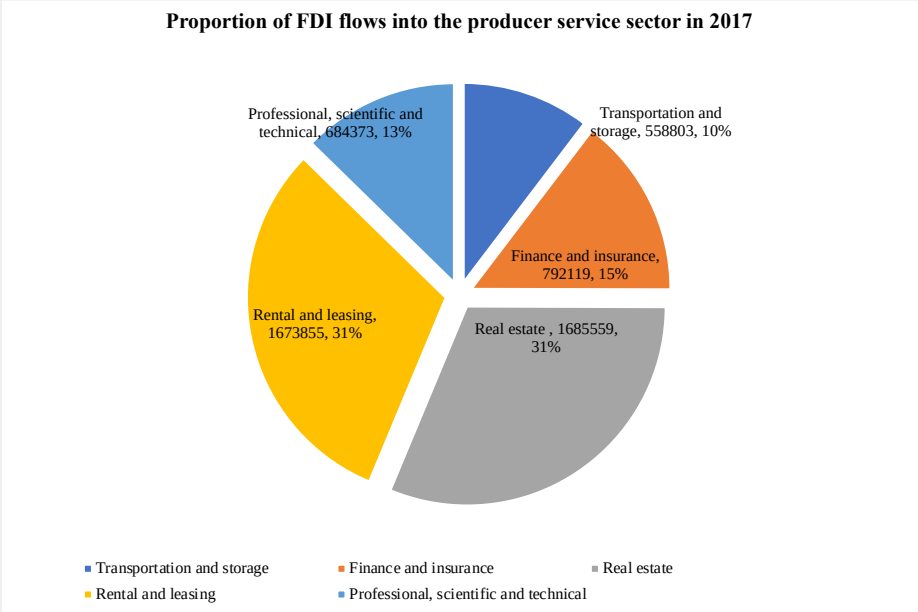
The ‘rental and leasing’ sector generally showed a steady growth trend, indicating that the government’s incentive measures implemented in this sector were effective. During the period from 2004 to 2007, there was a significant increase, with a growth rate of 443.91%, followed by a massive decline, which made the FDI value of this sector equal that of 2005. After 2007, the value of FDI increased steadily year by year, with an average increase of 20%, reaching a peak in 2017, at 1,673,855 million US dollars.

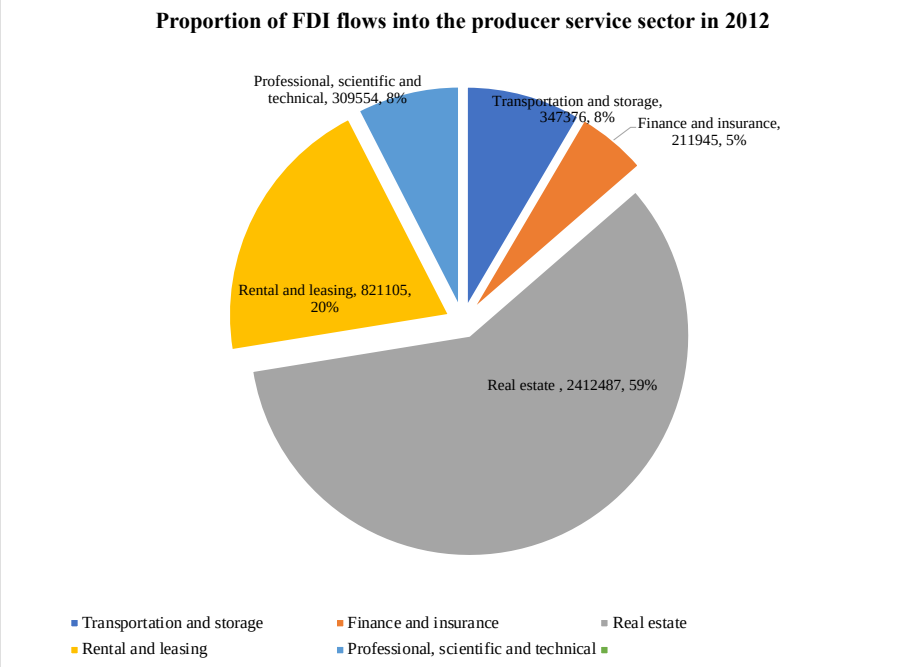
China’s government strongly encourages the financial services (finance and insurance) sector to introduce foreign capital to promote development in this area. It can be seen from Figure 2.13 that between 2000 and 2002, FDI in the financial services sector showed a year-on-year growth trend. This value increased rapidly in 2003, showing the most massive increase of 1204.28%. Between 2002 and 2005, the indicator continued to decline, reaching 21,969 million US dollars in 2005, lower than the value in 2002. Subsequently, the value of FDI in the financial services sector has experienced a substantial increase for many years, with a maximum increase of 257.92%, accompanied by some fluctuations. The largest decline occurred in 2007, reaching 66.13%, and the indicator began to climb year by year. From 2015 to 2017, the FDI in the financial services sector fell back, by nearly a quarter.

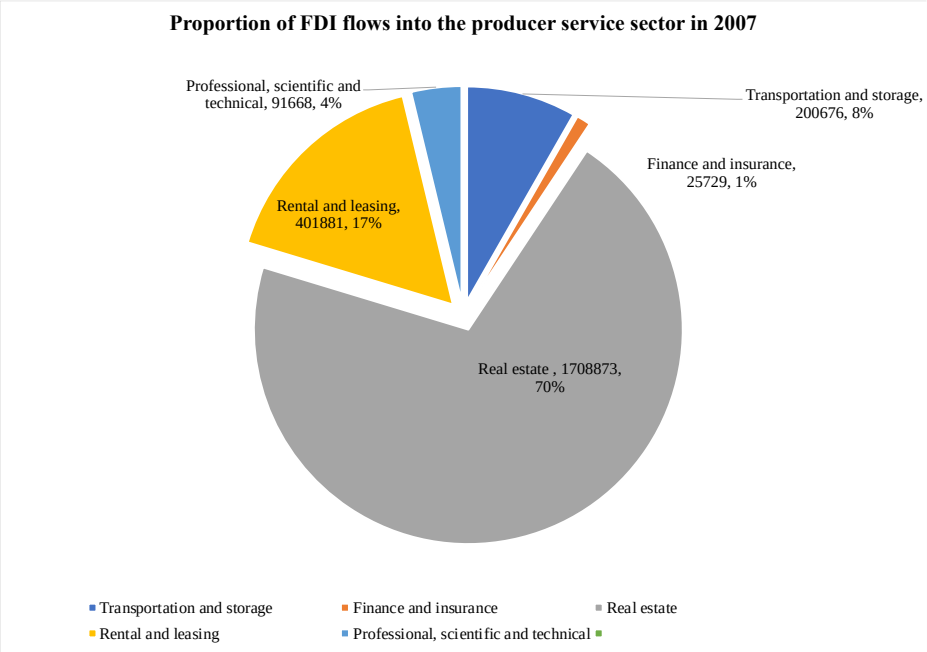
China has vigorously supported the introduction of technological FDI, hoping to promote the development of host enterprises and promote the process of industrial upgrading. In 2000, FDI in the professional, scientific and technical sector was at a low level of only 5,703 million US dollars. Subsequently, this value increased significantly in 2001 and 2002, with growth rates reaching 111.19% and 343.08%. It is noteworthy that the largest increase in FDI in the professional, scientific and technical sector occurred in 2006, when it reached 260,234 million US dollars, an increase of 664.47%, indicating that the country's policy support in this field was very effective. However, FDI in this sector fell sharply in 2007, a decline of 64.77%, and this value grew steadily between 2008 and 2012, reaching a maximum of 309,554 million US dollars in 2012. After a decline of nearly 11.15% in 2013, this value began to grow steadily, reaching its maximum in 2017.

The value of FDI in the transportation and storage services sectors fluctuated greatly. From 1997 to 2001, this indicator continued to decrease. Although it showed a downward trend, it still exceeded the value of FDI in other sectors, which also shows that this non-traditional service sector has developed earlier than other producer services segments. Since 2002, FDI in this sector has experienced significant growth for two consecutive years, with growth rates of 68.23% and 227.97%. The most significant decline in the transportation and storage services sectors occurred in 2007. Subsequently, the growth of the indicator was not always stable, despite this volatility it reached its peak in 2017.

Figure 2.14: Proportion of FDI flows into the producer service sector in 2007, 2012 and 2017



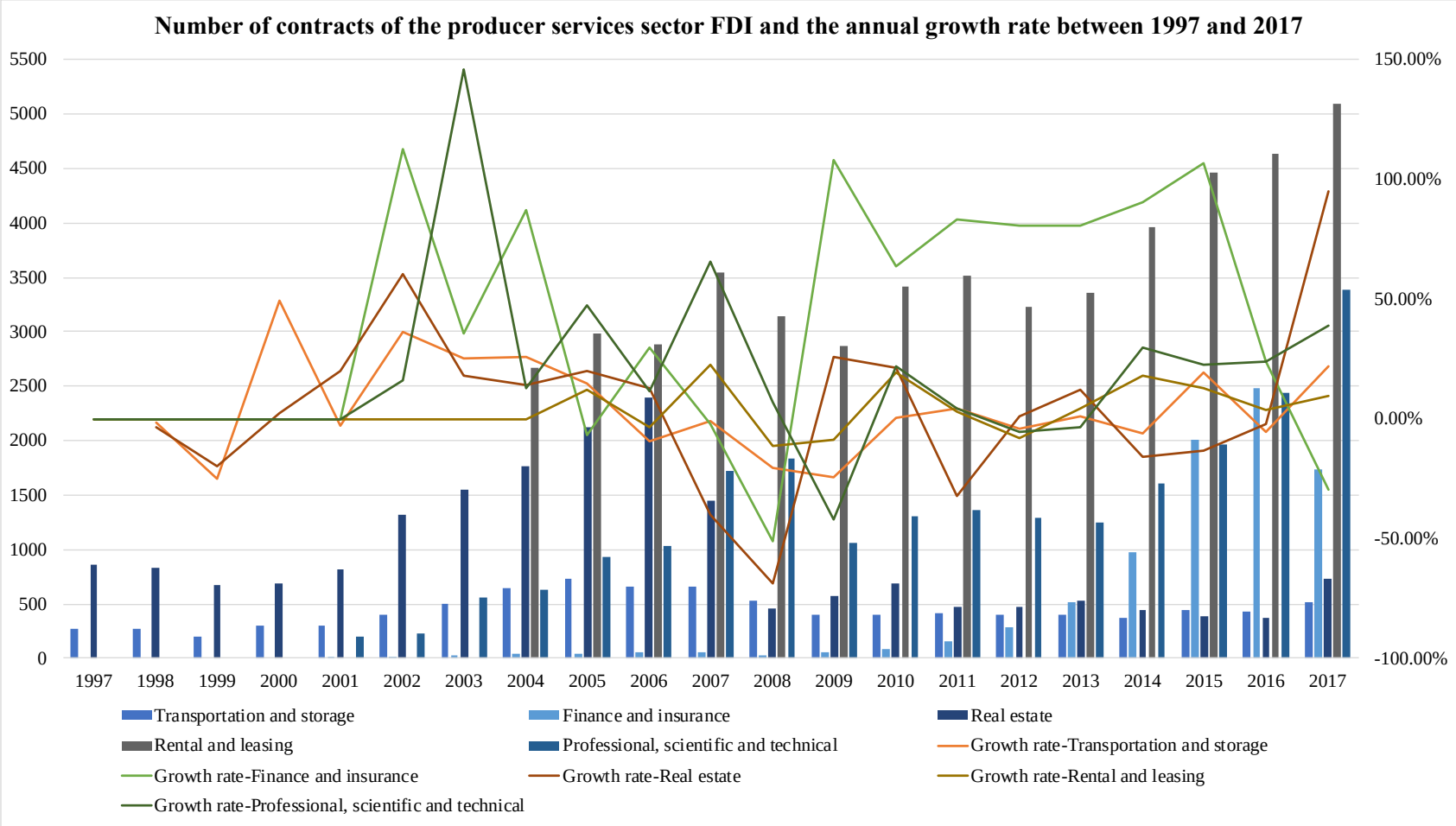




Source: Author's own calculations based on data from China Statistical Yearbook 2008, 2013 and 2018

As for the proportion of FDI flows into the producer services sector, in 2007 the proportion was unevenly distributed. The top three FDI inflows were 'real estate', 'rental and leasing', and 'transportation and storage', accounting for 70%, 17% and 8%, respectively. In 2012, this imbalanced distribution was slightly eased, but the value of FDI in the real estate sector still dominated, accounting for 59%, and the rental and leasing services sectors rose slightly, reaching 20%. The proportion of FDI inflows into the transportation and storage services sector remained at the original level of 8%. Until 2017, as the country strongly supported the balanced development of various industries and increased inward foreign capital, the proportion of FDI in the producer services sector was relatively balanced. FDI in rental and leasing and real estate services both accounted for 31%, still ranking in the first place. The proportion of FDI in the finance and insurance sector increased to 15%, ranking third. The value of FDI in the professional, scientific and technical and the transportation and storage sector remained relatively small, accounting for 13% and 10%, respectively.

Figure 2.15: Number of contracts of the producer services sector FDI and the annual growth rate between 1997 and 2017



Source: Author's own calculations based on data from China Statistical Yearbook 2008, 2013 and 2018

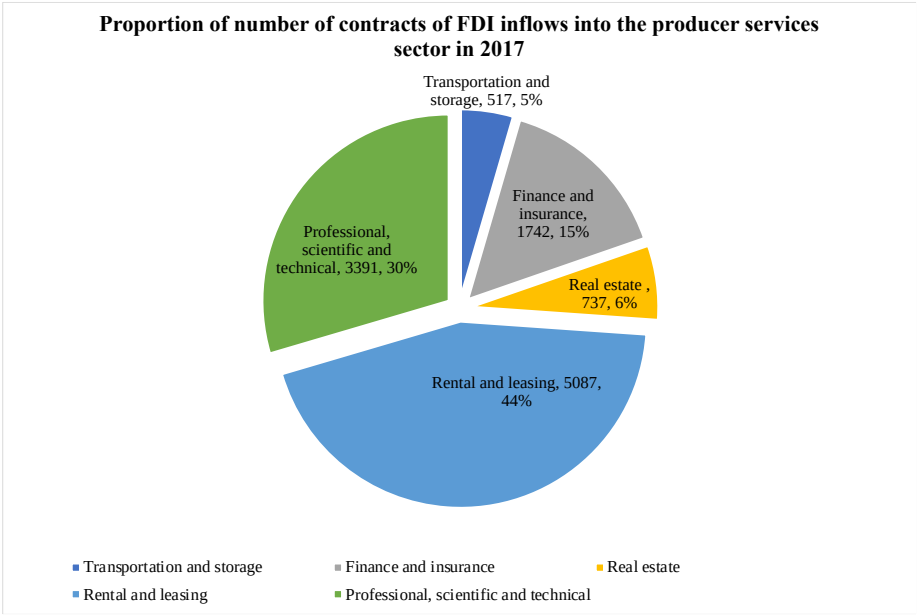
Table 2.7: Number of contracts of the producer services sector FDI and the annual growth rate between 1997 and 2017

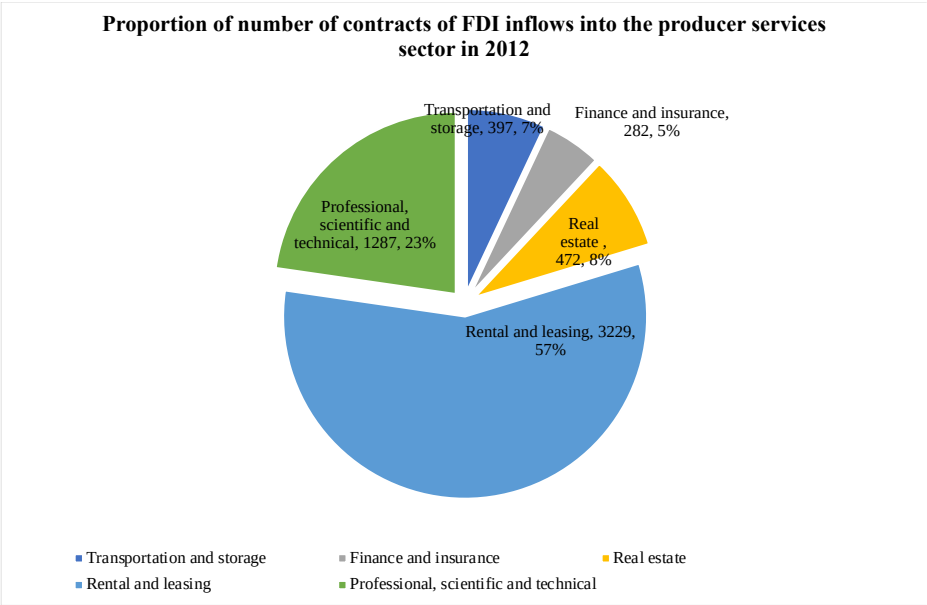
	Transportation and storage	Growth rate	Finance and insurance	Growth rate	Real estate	Growth rate
1997	279	-	-	0.00%	862	
1998	274	-1.79%	-	0.00%	834	-3.25%
1999	205	-25.18%	-	0.00%	669	-19.78%
2000	306	49.27%	-	0.00%	684	2.24%
2001	297	-2.94%	8	0.00%	820	19.88%
2002	405	36.36%	17	112.50%	1316	60.49%
2003	506	24.94%	23	35.29%	1553	18.01%
2004	638	26.09%	43	86.96%	1767	13.78%
2005	734	15.05%	40	-6.98%	2120	19.98%
2006	665	-9.40%	52	30.00%	2398	13.11%
2007	658	-1.05%	51	-1.92%	1444	-39.78%
2008	523	-20.52%	25	-50.98%	452	-68.70%
2009	395	-24.47%	52	108.00%	569	25.88%
2010	396	0.25%	85	63.46%	689	21.09%
2011	413	4.29%	156	83.53%	466	-32.37%
2012	397	-3.87%	282	80.77%	472	1.29%
2013	401	1.01%	509	80.50%	530	12.29%
2014	376	-6.23%	970	90.57%	446	-15.85%
2015	449	19.41%	2003	106.49%	387	-13.23%
2016	425	-5.35%	2476	23.61%	378	-2.33%
2017	517	21.65%	1742	-29.64%	737	94.97%

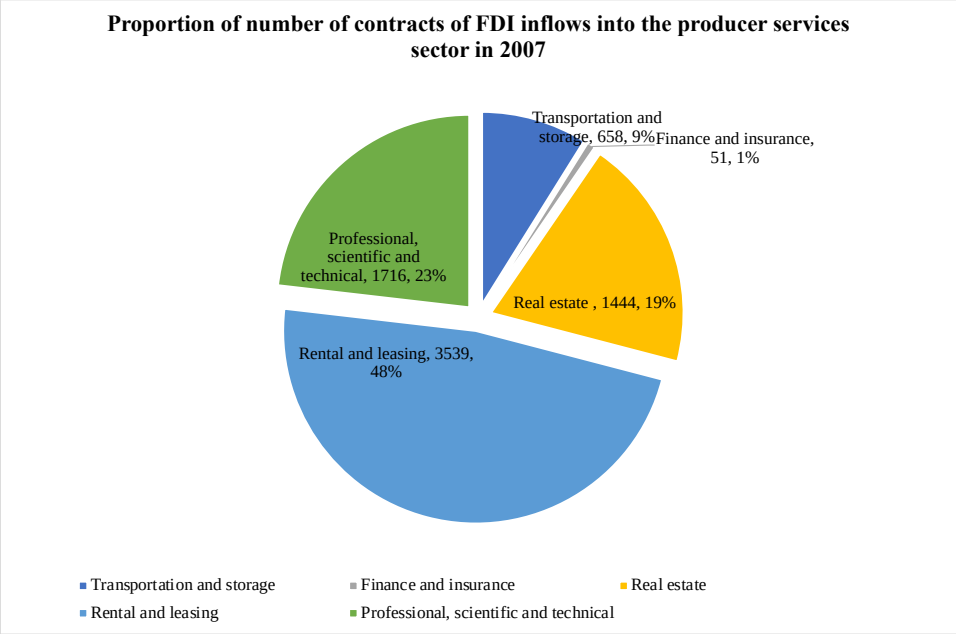
	Rental and leasing	Growth rate	Professional, scientific and technical	Growth rate
1997	0	0.00%	0	0.00%
1998	0	0.00%	0	0.00%
1999	0	0.00%	0	0.00%
2000	0	0.00%	0	0.00%
2001	0	0.00%	196	0.00%
2002	0	0.00%	227	15.82%
2003	0	0.00%	558	145.81%
2004	2661	0.00%	629	12.72%
2005	2981	12.03%	926	47.22%
2006	2885	-3.22%	1035	11.77%
2007	3539	22.67%	1716	65.80%
2008	3138	-11.33%	1839	7.17%
2009	2864	-8.73%	1066	-42.03%
2010	3418	19.34%	1299	21.86%
2011	3518	2.93%	1357	4.46%
2012	3229	-8.21%	1287	-5.16%
2013	3359	4.03%	1241	-3.57%
2014	3963	17.98%	1611	29.81%
2015	4465	12.67%	1970	22.28%
2016	4631	3.72%	2444	24.06%
2017	5087	9.85%	3391	38.75%

Source: Author's own calculations based on data from China Statistical Yearbook 2008, 2013 and 2018

Figure 2.16: Proportion of FDI contracts, number in producer services sector in 2007, 2012 and 2017







Source: Author's own calculations based on data from China Statistical Yearbook 2008, 2013 and 2018

The above three pie charts (see Figure 2.16) show the proportion of FDI contracts (and absolute number of FDI contracts) in the producer services sector. In 2007, the number of FDI contracts of the 'rental and leasing services' sector was 3,539, accounting for nearly 48%. The proportion of FDI contracts in 'professional, scientific and technical services' and 'real estate services' closely followed, with the number of contracts being 1716 and 1444, accounting for 23% and 19%, respectively. The number of FDI contracts in 'finance and insurance' accounted for only 1%. In 2012, the number of FDI contracts in the 'rental and leasing services' sector was 3,229, accounting for about 57% of the total. The number of FDI contracts in the 'professional, scientific and technical' sector accounted for 23%, similar to 2007. The most significant number of FDI contracts in 2017 remained in 'rental and leasing services', but the proportion was reduced by 13%. The number of FDI contracts for 'professional, scientific and technical' and 'finance and insurance' sector ranked second and third respectively, accounting for 30% and 15%, which did not change much from other years. The number of FDI contracts in the transportation and storage sector is still very marginal, accounting for only 5%.

2.6 Chapter summary

This chapter offered a detailed data-driven assessment of China's position of inward FDI as well as some of the policy restrictions China imposed over the years on FDI attraction. From the economic background, since China's accession to the WTO, FDI into China has gradually increased. In 2003, the total amount of FDI into China exceeded that of the United States, becoming the world's largest FDI recipient. Against this backdrop, the scale of FDI in China's service industry is also expanding. Since the 1990s, an essential feature of FDI has been the increasing proportion of services, and services have replaced the manufacturing industry as the most crucial part of the FDI structure. At the same time of the steady growth of FDI in the service industry, the growth rate of FDI in the producer services sector is accelerating.

As far as China's economic development is concerned, the government's influence on economic activities is significant. Therefore, in addition to the industry's economic characteristics, the FDI of the producer services sector is also greatly affected by institutional factors. The degree of economic liberalisation, the degree of stability, and the degree of standardisation of government behaviour are essential factors in a country's market environment. A market environment with less economic fluctuations and higher stability helps to reduce the risks of MNCs' operations. Economic liberalisation and increased marketisation will help to strengthen economic activities in a region and thus help attract FDI. Besides, the degree of standardisation of host government behaviour determines the country's reputation for international economic activities and is directly related to the international competitiveness of its economy. Especially for some developing countries, the degree of standardisation of government behaviour is low, and the international image is not good, often losing many opportunities to attract foreign capitals.

The producer services sector is the one with the fastest growth rate, the highest knowledge intensity and the highest concentration of high-level talents, and a vital force in promoting industrial restructuring. FDI in China's producer services sector is currently maintaining a bright development trend, but there are also apparent shortcomings. The country should focus on solving the existing problems, investing in

innovation, deepening the reform and opening-up policy, strengthening policy support, improving the supervision system and the quality and level of China's producer services sector development, to enhance its international competitiveness.

Chapter Three: Theoretical and empirical basis for location selection of FDI in producer services

3.1 Chapter overview

This chapter critically discusses the theoretical and empirical literature on FDI, specifically FDI in producer services and its location choice. Section 3.2 unpacks the definition of FDI drawing on those proposed by international organisations and academic scholars alike. The following section focuses on the development process and classification criteria of FDI in the producer services industry. Section 3.4 reviews key theories related to the location decision of FDI, such as monopolistic advantage theory, product life cycle theory, internalisation theory, the eclectic theory of international production and so on. Next, the chapter discusses additional determinants of location choice for FDI that are not hypothesised explicitly by traditional FDI theories. Section 3.6 presents a review of the empirical (applied) research on FDI in producer services. Section 3.7 proposes the conceptual framework distilled from the critical review of relevant literature, outlining the hypotheses to be tested empirically in subsequent chapters. Finally, a brief summary concludes the chapter.

3.2 What is FDI

At its broadest, FDI can be understood as an investment form based on the control of business management rights of a foreign enterprise, for the purpose of obtaining profits. Investors usually use FDI to control the company's property rights and directly participate in the management of the enterprise, in addition to gaining profits from the use of externally generated capital. As shown in Table 3.1, over time, scholars and international organisations have held different views on the defining features of FDI, emphasising different characteristics.

Table 3.1: A selected list of FDI definitions in previous literature

Source	Definition	Main feature
World Bank, Report to the Development Committee and Guidelines on the Treatment of Foreign Direct Investment (1992, p. 35)	*"a greater flow of foreign direct investment at brings substantial benefits to bear on the world economy and on the economies of developing countries in particular, in terms of improving the long term efficiency of the host country through greater competition, transfer of capital, technology and managerial skills and enhancement of market access and in terms of the expansion of international trade."*	Substantial benefits and improvement of the long-term efficiency of the host country
IMF, Balance of Payments Manual, fifth edition (1993, p. 93)	*"FDI as a category of international investment that reflects the objective of a resident in one economy (the direct investor) obtaining a lasting interest in an enterprise resident in another economy (the direct investment enterprise)."*	Lasting interest and control
OECD, Benchmark Definition of Foreign Direct Investment 3rd Edition (1996, p. 7)	*"Foreign direct investment reflects the objective of obtaining a lasting interest by a resident entity in one economy ("direct investor") in an entity resident in an economy other than that of the investor ("direct investment enterprise"). Direct investment involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated."*	Lasting interest and initial and subsequent capital transactions
UNCTAD, World Investment Report (2003, p. 231); UNCTAD,	*"Foreign direct investment (FDI) is defined as an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy (foreign direct investor or parent enterprise)*	Lasting interest, control and strong management rights

World Investment Report (2007, p. 245)	*in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise or affiliate enterprise or foreign affiliate). FDI implies that the investor exerts a significant degree of influence on the management of the enterprise resident in the other economy."*	
OECD, Benchmark Definition of Foreign Direct Investment 4th Edition (2008, p. 48)	*"(...) The direct or indirect ownership of 10% or more of the voting power of an enterprise resident in one economy by an investor resident in another economy is evidence of such a relationship. (...) while on the other hand, an investor may own less than 10% but have an effective voice in the management. Nevertheless, the recommended methodology does not allow any qualification of the 10% threshold and recommends its strict application to ensure statistical consistency across countries."*	Lasting interest and 'effective voice' in management operationalised as direct or indirect ownership of 10% or more of voting power
European Central Bank, Valuation of foreign direct investment positions final report (2013, p. 4)	*"Foreign direct investment (FDI) is a way of creating direct, stable and long-lasting links between economies. It promotes the development of international trade, encourages the international transfer of know-how and technology and is an important source of capital for many countries."*	Creating stable returns shared across countries

Author (s)	**Definition**	**Main feature**
Anderson, E. and Gatignon, H. (1986, p. 3)	*"Firms trade various levels of control for reduction of resource commitment in the hope of reducing some forms of risk while increasing their returns."*	Control
Hennart and Park (1993, p. 1054)	*"A firm which expands into foreign markets must choose between keeping or sharing control of its subsidiaries. It must also decide whether to acquire an*	Keeping and sharing control

	existing local firm (make an acquisition) or to build a new plant (make a greenfield investment).”	
Dunning, J. H. (1998, p. 45)	*“The OLI triad of variables (ownership, location and internalization, discussed below) determining foreign direct investment (FDI) and MNE activity may be likened to a three-legged stool; each leg is supportive of the other, and the stool is only functional if the three legs are evenly balanced.”*	Ownership, location and internalisation
Brouthers, K. (2002, p. 205)	*“(...) transaction costs increase, firms tend to switch their preference to more hierarchical modes, such as wholly owned subsidiaries.”*	Ownership
Dhanaraj et al. (2004, p. 295)	*“The role of equity ownership on the instability patterns of international joint ventures (IJVs) has been a classic problem in this research: (...) majority control as the best option for maintaining stability. ”*	Majority control (ownership)
Filatotchev et al. (2007, p. 558)	*“FDI decisions should also depend on the firm's governance characteristics, such as the distribution of ownership and control.”*	Governance features (ownership and control)
Demirbag et al. (2007, p. 418)	*“The equity ownership level in FDI operations is often related to survival, performance and stability, (...).”*	Ownership
Zhang, Y. et al. (2016, p. 22)	*“The distribution of ownership is one of the key decisions made by foreign investors entering new markets and operating in existing markets.”*	Ownership
Pan Y. (2017, p. 308)	*“(...) firms possess ownership advantages and need to protect their proprietary competitive advantages through a high ownership in the subsidiary.”*	Ownership advantages

Source: Table 3.1 is based on the author’s research and elaboration.

As can be seen from Table 3.1, in the early days, researchers mainly emphasised the degree of control as the central feature of the definition of FDI. This begs the question: “Why do scholars emphasise "control" so much?” First, for a long time, “control” was the traditional method of establishing FDI as long-term strategic decision-making in foreign entry. Entry mode selection emphasises the expectation of providing the highest risk-adjusted return under controlled conditions. Second, control determines whether foreign companies can effectively implement strategic decision-making and management of a foreign enterprise. If international companies cannot control effectively, they will find it more difficult to coordinate activities, actions, devise and implement strategies, and resolve inconsistencies (Davidson and Mcfetridge, 1984).

In recent years, the definition of FDI has gradually shifted the notion of ownership from the concept of “control” that was emphasised initially towards the idea of “lasting interest”. For example, the European Central Bank defines FDI based on the OECD benchmark definition, which highlights the notion of “lasting interest” as a long term relationship quantified by “*The direct or indirect ownership of 10% or more of the voting power of an enterprise resident in one economy by an investor resident in another economy is evidence of such a relationship.”* (OECD, 2008, p. 48; ECB, 2013, p. 4). Of course, the idea of exerting “control” of the acquired entity has never been fully ignored because proper control guarantees long-term and stable returns. In other words, “control” has been subtly transformed into the basis for obtaining the lasting benefits and the compelling voice in running the (foreign) business.

The evolution of the definition of FDI has emerged as a new direction of research that begins with the ideas of “control” and “lasting interest” shifting to absolute discourse in management. This discourse highlights that power is often reflected in the distribution of ownership, because the choice of ownership structure is the main decision made by foreign investors in organising their business activities; a decision that has a significant impact on performance. As Zhang et al. (2016) suggest, more substantial ownership can protect foreign investors from being shelved, and small ownership can avoid government intervention so that foreign investors will adjust their

share of ownership in line with the institutional environment. However, this is not an absolute rule, and the size of ownership should not be the sole judgement factor for investors to influence or implement effective management. As the OECD (2008) acknowledges, investors with less than 10% ownership can still have an effective voice in management, though such investor may not exert significant control. Ultimately, it should be apparent that although the qualification of the 10% threshold is a necessary methodological expedient to ensure statistical consistency across countries in the computation of FDI data, the exact share of ownership that determines control is dependent, in each instance, on how widely distributed the remaining ownership is.

Some literature also emphasises the importance of extent of "ownership" in the definition of FDI connected to the motive for foreign entry, suggesting that foreign companies with market-seeking motives have an incentive to own a large share of subsidiary ownership. As Pan (2017) suggests, foreign companies with ownership advantages can protect their proprietary competitive advantage in the market competition through the high ownership of subsidiaries. These investors can make full use of the advantages of overseas' markets by having a large share of ownership and a high share of profits (Brouthers, 2002; Pan, 1996). However, while many researchers suggest that companies seek penetrating foreign markets usually preferring a high-level of subsidiary ownership, the ownership choices of these companies may vary depending on the market environment of the different host countries (Ramasamy et al., 2012).

Nevertheless, there are also cases that run counter to the expectations noted above. For example, companies that invest in host countries to seek resources often choose to have low subsidiary ownership. Bass and Chakrabarty (2014) contend that foreign companies need to invest large amounts to own a large share of these subsidiaries, though potential returns cannot be guaranteed. Also, when foreign companies enter the host country market to obtain natural resources, host countries often establish various barriers based on the protection of local (indigenous) industries (Buckley et al., 2007).

With the continuous development of economic globalisation, the proportion of greenfield FDI[3] has declined. At the same time, cross-border mergers and acquisitions (M&As) have become a transnational direct investment method in which multinational corporations (MNCs) participate in the process of world economic integration and maintain a favourable competitive position. Many scholars have discussed the choice of greenfield FDI vs. cross-border M&A. Greenfield FDI is said to have a greater impact on the economic stability of the host country than M&As. Burger and Ianchovichina (2017) argue that fluctuations in greenfield FDI cause extreme volatility (sudden increase or decrease), despite the fact that greenfield FDI has a long gestation period requiring MNCs to build foreign production facilities from scratch (from a 'green field' as it were) in a foreign country. Greenfield FDI also brings more competitive pressure to the local product market than M&As. Greenfield FDI creates new assets and increases domestic production capacity. In contrast, foreign companies often transfer existing assets and production capacity from local to foreign markets through M&As, and the competitive pressures in the local market may remain unchanged (Forte, 2016). However, policymakers in both developed and developing countries generally prefer greenfield FDI to M&As. Ashraf et al. (2017) observed that policymakers often encourage greenfield FDI through subsidies and incentives.

[3] "Greenfield FDI is, by definition, an investment in new productive facilities. Hence, assuming that no viable domestic investment will take place in the absence of such FDI, it immediately adds to the stock of capital in the host country." (UNCTAD, 1998: p. 212)

3.3 What is producer services FDI?

Table 3.2: Selected producer services FDI definitions from previous literature

Author(s)	Definition	Main feature
Bagchi-sen, S. (1995, p. 163)	*"(...) producer services may agglomerate near business consultants, research institution, hardware producers and government organizations, as well as near their final market."*	Agglomerate near knowledge intensive services sector
Noyelle, T. (1997, p. 80)	*"(...) firms are typically better at shifting their business mix away from lower margin services (such as audit) toward higher margin services (such as consulting), building up a competitive advantage in the form of unique expertise that they use to strengthen their position in foreign markets."*	Unique expertise
Stare, M. (2001, p. 26)	*"Since the producer services are knowledge and skills intensive, FDI in producer services could also be important from the point of view of technology transfer to host countries."*	Knowledge and skills intensive
Berko, L. and Eyuboglu, E. (2007, p. 367)	*"Because producer services provide professional services to businesses and other professional services, they need to be spatially close to consulting and other complementary service areas."*	Agglomerate in proximity of knowledge intensive services sector

Source: Table 3.2 is based on the author's research and elaboration.

Beneficial effects of producer services, including innovations, are diffused throughout the economy. As Noyelle (1997) states, the basis for high efficiency of foreign providers of producer services is the specialised knowledge and skills that are proprietary assets. However, this does not refer to technology transfer in its narrow

sense, but to ‘soft technology’, meaning the transfer of professional knowledge, skills and experience to employees in host countries.

In transition economies, specialised knowledge and skills related to management, organisation (new methods and techniques, introduction and maintenance of high quality of services) and marketing, are particularly deficient. Further benefits of FDI in producer services are related to the strengthening of competition, faster development of local markets for services in transition economies, and an increased level of market sophistication in terms of modern technology and range of services (Stare, 2001).

The ‘producer services’ sector usually refers to the service sector as an intermediate input in the production process of the product or in the process of providing the services. Some literature suggests that manufacturing companies assess the technical level, market share and value added of their products by purchasing producer services or directly expanding their business into the producer services (Reiskin et al., 1999). However, the generation of the concept of producer services is best seen as a process, since it has evolved over time. For example, some researchers have listed specific service categories of producer services, while others have integrated the industry interaction into this concept and incorporated some new salient aspects or features within previous conceptualisations, thereby extending or qualifying the notion of ‘producer services’.

As Berko and Eyuboglu (2007) suggest, producer services need to be spatially close to consulting and other complementary services. Therefore, these services need to be brought together in the Central Business District (CBD). Since the background features do not require a high level of personal contact, they do not have to pay high rents in the CBD. As a result, affordable rents and land prices in the suburbs have led to the decentralisation of these services (Coffey and Bailly, 1992).

Table 3.3: Definitions of producer services from the inception of the concept

The proposed timeline of the producer service generation			
Year	**Author(s)**	**Contribution**	**Reason for this classification**
1962	Machlup	He was the first to point out that the producer service industry should be an industry that generates knowledge and technology.	From the perspective of 'connotation' of generating 'knowledge and technology'
1966	Greenfield	Recognised as the first author to propose the concept of a producer service industry, he believed that it should be classified according to its 'functionality' but does not indicate the specific service category.	Functionality
1975	Browning and Singelman	They cited the following services that may be involved in the producer services industry: financial, insurance, legal business services, brokerage and other knowledge-intensive services that provide professional services to clients.	Functionality, knowledge-intensive
1986	Hubbard and Nutter	The specialist area of producer services is services outside the consumer services sector, including cargo storage and distribution, office cleaning and security services.	Types of service outside consumer services
1986	Riddle	The producer service industry should be a sector that is separated from the manufacturing industry.	Industrial division from manufacturing, boundaries
1987	Mashall and Wood	They pointed out that the producer service industry should include providing service activities related to information processing as well as physical related service activities and services related to personal support.	Service activities
2000	Coffey	He believes that producer services are defined as the industry's use of human capital and intellectual capital as the main input.	Intellectual capital investment
2005	Guerrieri and Meliciani	They affirmed Riddle's point of view and emphasised the interaction between manufacturing and producer services.	Industrial division

Source: Table 3.3 is based on the author's research.

In the long history of research on producer services, researchers have highlighted different features of what constitutes producer services. Therefore, there are different views on the classification methods of the producer services industry. The first industry-recognised concept of the producer service industry was proposed by the American economist Greenfield (1966), who simply classified the service industry according to its functionality. The definition of this concept lays the foundations for further research on the producer services industry, which underscores the functional heterogeneity of the service industry and emphasises the importance of its intermediary 'function' but without specifying any individual service categories. In other words, this definition is based on the service object, highlighting that producer services are mainly provided for intermediate entities such as production and business activities.

Machlup (1962) took the lead in offering a more detailed definition of the producer service industry from an 'output' perspective, pointing out that the producer services industry should be an industry that produces 'knowledge and technology'. This definition highlights a key connotation of the producer services industry but does not list specific services.

Browning and Singelman (1975) too examined the concept of producer services industry from the perspective of the service industry's functionality and illustrated that the producer services industry may involve the following services: finance, insurance, legal business services, brokerage, etc., which are knowledge-intensive and services where customers are themselves provided with specialised services. Browning and Singelman define producer services from the 'functional' perspective, in line with Greenfield's view, but they additionally emphasise the knowledge-intensive and specialised features of such services and further enumerate the producer services in question. Howells and Green (1986) also believe that producer services refer to services such as insurance, banking, finance, and other business services (advertising, market research, accounting, legal services, and research and development services).

Hubbard and Nutter (1982) argue that services should be divided into ‘producer services’ and ‘consumer services’. The specialised areas of the producer services sector are services outside the consumer services sector, including cargo storage and distribution, office cleaning and security services.

Riddle (1986) used the idea of the industrial division of labour to define the concept of producer services and pointed out the integral relationship between manufacturing and producer services industries. His ideas have been later validated by many scholars who have pointed out the likely interaction between manufacturing FDI and producer services FDI. Guerrieri and Meliciani (2005) seem to agree with this idea, arguing that the structure of a country's manufacturing industry will determine the development prospects of the producer services industry.

Mashall and Wood (1987) argue that the producer services industry should include the provision of service activities related to information processing such as research and development (R&D), advertising, market research, media, etc., service activities related to physical goods such as equipment installation and maintenance, repair, etc., and services related to personal support such as cleaning services. This definition of producer services is based on the perspective of service activities, which is different from the definitions proposed by the above researchers.

As mentioned earlier, at its broadest, producer services refer to the service sector that provides guarantee services for maintaining the continuity of the industrial production process, promoting technological progress, industrial upgrading and improving production efficiency. From the perspective of capital investment, Coffey (2000) defined producer services as the industry sector that uses human/intellectual capital as the primary input so that producer services can promote the specialisation of production, expand capital and knowledge-intensive production to improve the productivity of labour and other factors of production. In his definition, producer services could be understood as both, a ‘supporting service industry’ directly related to the manufacturing industry, and an ‘emerging industry’ independently developed from the production service sector within the manufacturing industry but one that does not provide consumers with a direct and independent service utility. This definition emphasises

“sequence”, for instance, producer services highlight the intermediate output rather than the final output involved in industries such as the services sector and the manufacturing sector.

The United Nations Statistics Department revised the entire classification of economic activity into 21 categories in the International Standard Industrial Classification of All Economic Activities (ISIC, Rev. 4.0, referred to as the International Standard Industrial Classification). It designated that the production services sector covers five areas: financial and insurance, information services, modern logistics, technology services and business services.

The National Development and Reform Commission of the People's Republic of China (2006) promulgated the classification of ‘producer services’ in the 16th chapter of the Fourth Outline of the ‘Eleventh Five-Year Plan’. This report divides the producer services industry into transportation, modern logistics, financial services, information services and business services.

Table 3.4: The list of official documents of China and the United Nations on the classification of Producer Services

Producer Services classification(official) in China		
Date	**Issuing Organisation**	**Document**
March 2006	National Development and Reform Commission of the People's Republic of China	'Eleventh Five-Year Plan' for National Economic and Social Development (the 16th chapter of the Fourth Outline)
30th June 2017	General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China and China National Standards Management Committee	Industrial classification for national economic activities (GB/T 4754-2017)
27th March 2018	National Bureau of Statistics of China	The revised 'Three Industry Classification Regulations (2012)'
United Nations' Producer services classification (official)		
Date	**Issuing Organisation**	**Document**
2006	The United Nations Statistics Department	International Standard Industrial Classification of All Economic Activities (ISIC, Rev. 4.0, referred to as the International Standard Industrial Classification)

Source: Table 3.4 is based on the author's research and elaboration.

Many scholars and institutions have defined the producer services sector as an 'intermediate demand' service (not 'final demand') that usually entails knowledge and professional skills. Although there is general agreement in the literature on these two characteristics, scholars have not yet reached a consensus on the full range of specific activities that comprise or should be included in producer services. Currently, the industry division classification of producer services in China is mainly based on the four official documents that are summarised in Table 3.4. In this PhD thesis, I will adopt the widely accepted extension of the producer services in the Eleventh Five-Year Plan (see Table 3.4). According to this extended definition, the producer services sector provides market-oriented intermediate services (not final consumer services), which can be considered as intermediate inputs for production of other products or services. Thus defined, producer services can be said to be characterised by a high degree of specialisation and knowledge-intensiveness, including those featured in important industries such as transportation, modern logistics, financial services, information services, etc.

3.4 Critical Review of Selected FDI Theories

The market imperfections and monopolistic advantage theory of FDI

Theoretically, it is postulated that as a result of market failures or imperfections in product or factor markets, some firms enjoy firm-specific, monopolistic advantages not shared by foreign competitors, the existence of which constitutes the basis for enterprises to obtain profits in overseas markets. However, as noted by De Vita and Lawler (2004), this hypothesis does not explain why enterprises enjoying such advantages would necessarily exploit them via FDI rather than, say, through exports. It was Hymer (1960) in his doctoral thesis who pioneered the concept of 'Monopolistic Advantage' that he also used to explain international direct investment arguing that the knowledge-intensive industries were most likely to generate FDI monopolistic advantages.

Hymer's thesis laid the foundation for the study of the international business of MNCs, and some of his insights also shed light on the motivation for FDI. For example, he pointed out in the second and third chapter, that companies should use FDI to control other companies, which would reduce the competition, allow them to take advantage of the acquired company's specific advantages, and make them gain more profits by establishing business overseas. Also, when a company loses its special advantage in a foreign market and causes overseas business to be threatened, it can achieve full control of this special advantage through FDI. Since then, building on the monopolistic advantage hypothesis he proposed, Hymer (1970) suggested that enterprises in developed countries would more likely undertake FDI in regions without technology, information and advanced management experience. Through the in-depth study of the theory of monopolistic advantage[4], many researchers have arrived to the conclusion that 'technological advantage' is the core ownership (competence) of MNCs. Dellestrand and Kappen (2012) further contend that the technical/technological advantage would spread from the parent company to the subsidiary company, thus allowing the MNC to realise the benefits of economies of scale (and scope) and hence obtain higher profits through large-scale production (and conglomerate organisation).

The market imperfection approach to the study of FDI was extended by Buckley and Casson (1976) whose work concentrated on the benefits resulting from internalisation - through vertical integration - in imperfect markets. Under this logic, MNCs obtain market power through the efficient internalisation of market transactions for intermediate products. Buckley and Casson's (2009) study emphasises the industry and corporate factors of market failure while recognising the importance of relations with host governments. Establishing friendly relations with host countries has in fact become an important factor in the success of MNCs' overseas operations. As pointed out by De Vita (2001), both the firm-specific and internalisation-incentive advantages discussed

For example, as noted by De Vita (2001), the behaviours of enterprises operating in imperfect markets, was also examined by Knickerbocker (1973), who concluded that it is the uncertainty and interdependence that characterise the nature of oligopoly which explain the observed clustering in such industries.

above, also constitute two key pillars of the eclectic theorem of international production (developed by Dunning) that is critically reviewed later in this chapter.

Knickerbocker (1973) too formulated an FDI theory based on market imperfections. The literature emphasises two important motives for choosing a specific country as a location for FDI: (i) increased access to the host country's market; and (ii) relatively abundant factors or resources available in that country. Knickerbocker also cited a third motivation for choosing a particular location: matching a rival's move. This means that often MNCs exhibit imitative behaviour, i.e., they follow the internationalisation of rivals (i.e., competitors) to maintain their strategic advantage. Specifically, Knickerbocker argued that in oligopolistic industries, enterprises tend to follow each other's location decision.

Product life cycle theory

Vernon (1966) put forward the product life cycle theory and divided the stages of the product entering the market into three phases: innovation, maturity and standardisation. According to the product life cycle theory, the emergence of FDI starts from the product reaching the maturity stage, where competition becomes fierce and the innovator looks for low cost markets to produce the product even cheaper. Countries in the model are divided into the most developed countries, other developed countries and less developed countries. The theory predicts that production costs determine the direction of FDI, and that it is at the maturity stage - when competition becomes fierce – that MNCs from developed countries will make FDI so as to shift production in countries and regions with location cost advantages. In general, the product life cycle theory is to take advantage of the advantages of MNCs and the low-cost production available via the location advantages of the host country in order for MNCs/innovatots to remain competitive against the competition from enterprises in developing countries that can now copy the spreading technology.

Table 3.5: Vernon's three stages of MNEs international investment

Vernon's three stages of the life cycle theory			
Stage	**Goal**	**Investment target/market**	**Main features**
The first stage	Innovation	Domestic market	MNEs are in the stage of product innovation, and their production costs are high.
The second stage	Maturity	Expand domestic markets, export to other countries and undertake FDI to take advantages of lower costs of production in developing countries	In order to effectively avoid trade barriers, or to take advantage of lower costs of production in developing countries, MNEs from developed countries begin to enter countries with similar domestic conditions through FDI based on technological advantages.
The third stage	Standardisation	Other countries. Companies from developing countries begin to imitate the product technology embedded in FDI	The competitive advantage of the enterprise has shifted from 'technology' to 'price'

Source: Table 3.5 is based on the author's research and elaboration.

Black and Abernathy (1979) analysed the innovation behaviour of the product life cycle hypothesis and took the American automobile industry as the context to conduct an empirical study. Based on the analysis of the whole life cycle of products, this study points out the characteristics of technological innovation in different stages of product development. First, in the early stage of new products, the production process is flexible, and it is easier to absorb and combine the fundamental changes in products. After that, the tolerance of the market to the product itself decreases significantly, and the technological changes mainly focus on the self-strengthening of the production process, displaying the characteristics of refinement and immobilisation. Finally, the implementation costs of changing products increase significantly, but the rate of return on productivity improvement decreases significantly, resulting in a "productivity dilemma".

Although this study was based on the product life cycle theory and lacked sufficient evidence to generalise its findings to a stylized fact holding at broader industrial level, it is still considered as one of the critical starting points for the empirical scrutiny of the industrial life cycle theory.

Internalisation theory

As hinted to in section 3.4.1 above, FDI can eliminate the imperfections of the external market through internalisation leading to the optimisation of the intermediate production links of products. Buckley and Casson (1976) proposed the internalisation theory and explained the motivation of FDI from the perspective of intermediate products. Following internalisation through vertical integration, production costs are reduced to the production cost of direct use of the market for resource allocation, and there will be FDI inflow in the region. Casson (2018) proposed the theory "internalisation plus", which adopts game theory and focuses on the equilibrium result of competition among enterprises in the industry. This theory mainly applies to the FDI of enterprises with advanced technology.

The Uppsala internationalisation model

Monopolistic advantage theory and internalisation theory were developed in the 1960s and 1970s. At that time, MNCs dominated the world economic stage. Therefore, these theories concentrate on mature MNCs. However, these theories cannot explain the phenomenon of the process of internationalisation of MNCs. The Uppsala internationalisation model seeks to fill this gap by investigating how MNCs have come to be, i.e. how they evolved through internationalisation.

The Uppsala model is a progressive enterprise internationalisation theory based on the analysis of the internationalisation process of Swedish companies by Johanson and Vahlne of Uppsala University in Sweden. The model considers that the internationalisation process experienced by companies is generally as follows: accidental exports, agency exports, the establishment of overseas sales organisations, and overseas direct production (Johanson and Vahlne, 1977, 2006). Hence, FDI is realised through gradual development and increasing deployment of resources through further acquisition of knowledge of overseas markets.

Based on the analysis of the internationalisation process of Swedish companies, Johanson and Wiedersheim-Paul (1975) argued that internationalisation through FDI, is the result of a series of progressive decisions. The model focuses on companies' gradual deepening of participation in foreign markets through the gradual acquisition, integration and use of foreign market knowledge. The model also pioneered the concept of "psychic distance" (as distinct from 'geographical distance'), which is the sum of the factors that hinder the flow of market information, for example, differences in language, education, business practices, culture, and industrial development. It is believed that cultural and linguistic differences between the investor and the host country will determine the pattern of FDI in the sense that - according to the model – firms will invest first in 'psychically close' markets, and only later in 'psychically distant' markets.

The internationalisation process model has enjoyed considerable interest mainly because it avoids the typical pitfalls of a rigid stage model. Yet, despite a myriad of applications, extensions, further developments (for example, Vahlne et al., 2011, employed the Uppsala model to investigate the globalisation process of Volvo's heavy

track business, while Coviello et al., 2017, further developed Vahlne and Johanson's (2017) arguments by adding further dimensions) and attempts to defend the model by arguing that many of the alleged weaknesses stem from misunderstandings in the way in which the model has been interpreted (see Welch et al., 2016), the fact remains that the Uppsala internationalisation hypothesis has not been validated by empirical studies. Millington and Bayliss (1990) were the first researchers who found that the postulated stepwise international development predicted by the model (from serving foreign markets first via exports through to ultimately engaging in full-blown FDI) did not reflect the actual internationalisation process of UK MNEs in the European Community. By way of critical scrutiny, it could also be noted that the model also fails to reflect the rise of the so-called 'born-global' firms, which - especially in high-technology sectors - are international at the outset (for example, companies such as Amazon, Google, Alibaba).

At the same time the Uppsala model was developed, some scholars in North America (Bilkey and Tesar, 1977; Coviello and Munro, 1997) proposed the "innovation model" of enterprise internationalisation – largely based on Rogers' (1962) 'innovation diffusion theory', which stated that enterprises' internationalisation rests on management innovation. Within this sociological model of innovation diffusion, the "push mechanism" outside the enterprise includes changes in market structure and in the external business environment, while the "pull mechanism" within the enterprise consists of the innovation of the enterprise's system and the formation of the ownership advantage. In terms of the description of the stage of internationalisation of enterprises, although the different scholars mentioned above have different expressions of process models and innovation models, they mostly share the view that firm internationalization is a gradual, development process.

Some economists of enterprise internationalisation mainly focus on the determination of the internationalisation mode of enterprises, and the process school pays attention to the dynamic evolution of the internationalisation mode of enterprises. Mcdougall et al. (1994) published the article "On the theory of international new ventures" synthesising the emerging internationalisation theory. However, the contribution did not pay much

attention to the international model selection of international start-ups, focusing instead on the outcomes of MNCs' internationalisation.

Partly aimed at filling this gap, Mcdougall and Oviatt (2000) put forward the theory of "international entrepreneurship" which, they argue, regards the process of enterprise internationalisation as a form of international entrepreneurship. 'International Entrepreneurship' is a process by which companies discover, develop, evaluate, and use corporate growth opportunities across borders to create future products and services. However, such emerging internationalisation theories do not pay much attention to the model of corporate internationalisation and its evolution, focusing instead on the factors that influence the success or failure of international corporate entrepreneurship, including entrepreneurship, network of relationships, and access to global opportunities.

Transaction cost theory

Williamson (1987) developed transaction cost theory originally hypothesised by Coase (1937) and classified transaction costs into two categories: ex-ante and ex-post. To some extent, the imperfect external markets may lead to high transaction costs. If we assume that the market is perfect, therefore, more companies will choose to outsource rather than internalise through (vertical) FDI (Liesch, 2012). In fact, because of the imperfect market, enterprises could either outsource part of the production process or internalise the production process. FDI emerges when MNCs replace the external market with the internal transfer of intermediate products (Buckley, 2014). On the other hand, in terms of foreign exchange transaction costs, the largest or most effective investor is willing to arbitrage to guarantee the lowest cost (Aliber, 1984).

Marginal industry expansion theory

According to marginal industry expansion theory, FDI should start from domestic, marginal industries. Kojima (1977) stated that FDI would enter industries or fields with obvious or potential comparative advantages in host countries from industries that have lost or are about to lose their comparative advantages. Compared with large enterprises, small and medium-sized enterprises (SMEs) tend to be more disadvantaged and become

"marginal enterprises". Therefore, multinational enterprises (MNEs, also referred to as MNCs in this thesis) should be expected to make more outbound direct investment. Geroski and Kojima (1979) too argued that FDI often begins with declining industries in host countries.

The theory of marginal industry expansion applies to many developing countries and has the following characteristics. Firstly, it holds that foreign enterprises tend to invest in industries that are losing or gradually losing their comparative advantages, such as the traditional energy industry and labour-intensive industries. Secondly, this theory posits that these enterprises may not necessarily have a monopoly on technical advantages but are usually SMEs with mature technology. Thirdly, foreign enterprises often choose to invest in enterprises with similar technologies, which are more suitable for the local factor structure of production in the host country and still conduct production with an export-oriented aim (Li, 1988; Liu, 1992).

The eclectic theorem of international production

When considering transnational investment, the location of the host country is crucial alongside consideration of the MNC's monopolistic advantages. By combining the location and monopolistic advantage theories with internalisation theory, Dunning (1981) proposed the 'eclectic paradigm of international production'. The locational advantage is divided into four broad aspects: labour cost, market potential, trade barriers and host government policy.

Dunning's eclectic paradigm (also known as 'the OLI framework') is the core of the eclectic theory of international production. Dunning (1981) believed that investment behaviour depends on the company's Ownership advantage (Ownership), the Location advantage of the host country (Location) and the Internalisation of the enterprise (Internalisation) operating at a different stage of the production process (through either forward or backward vertical integration). Dunning (1981) posited that the theory of ownership advantage should be the premise of enterprises' international investment behaviour. The ownership advantage could be divided into transferable advantages (patent, production technology, information, capital, etc.) and non-transferable

advantages (enterprises' large-scale production advantages, management advantages, etc.). In addition, Dunning's eclectic paradigm suggested that FDI had three main motives: foreign market seeking, efficiency-seeking and resource-seeking (Dunning, 1988).

One of the key strengths of this framework, still considered the most comprehensive framework developed to date for the analysis of geographical, sectoral and industrial patterns of FDI, lies in its eclectic nature, i.e., its ability to combine elements of various approaches – namely, ownership, internalisation and location advantages - that are inevitably interrelated by nature (Dunning, 1998). However, the eclectic paradigm has not escaped criticism. For example, as observed by De Vita and Lawler (2004), by including so many factors that influence both firms' motivations to engage in FDI and countries' characteristics that can attract FDI, the framework loses its operationality. Indeed, they write that: "*no testable predictions can be deduced from the 'paradigm', and while location variables can easily be included in FDI regressions, it is much more difficult to estimate the relevance of motives linked to the ownership and internationalization advantages underlying the OLI triad*" (De Vita and Lawler, 2004, p. 20). Furthermore, Dunning and Lundan (2008) proposed a theoretical framework by linking the micro and macro dimensions, and examined the institutional dimension by extending the OLI paradigm.

3.5 Other FDI determinants

This section will highlight other specific FDI determinants that have been discussed in the wider theoretical and empirical literature on FDI.

Many factors may influence FDI geographical choices (location country choice in FDI), such as market size, cost advantage and the policy support of the host country. First, the scale and prospect of the market are important factors influencing FDI entry. Dunning and Norman (1987) reveal that factors affecting the location of a foreign corporate office vary by office type and industry. For example, the size and prospects of the market are significant, and the quality of inputs such as the travel and communication facilities (i.e., physical and telecommunication infrastructure) along

with the availability of labour and support services, are also essential. Second, to optimise the allocation of resources, reduce costs and obtain higher profits, FDI is a great attraction also as a way to inject foreign capital into the host country. From this aspect, it is clear that the quality and availability of resources is often more important than direct costs, but with one crucial exception: space costs (Dunning and Norman, 1987). Third, to attract more FDI, host countries often adopt specific tax and regulation policies that act as incentives. In the long run, the introduction of foreign capital will inevitably lead to economic growth and an increase in fiscal revenue. But in the short term, if there are too many tax incentives, it will harm fiscal revenues (Edmiston et al., 2003). The practice of internalisation theory in FDI could also be understood as follows: tariff and non-tariff barriers could protect the economic activity of MNEs in host countries. Furthermore, this form of protection could also protect MNEs' businesses from the impact of other countries' imports in the host countries and thus encourage the entry of FDI in the country or region (Merz et al., 2017). Through analysing the US FDI inflows, from the perspective of host countries' local enterprises, compared with other types of FDI such as joint ventures, the negative impact of expanding or building factories on the profits of local enterprises is much more significant (Bruce et al., 2004). Fourth, the accumulation of the development of the previous manufacturing industry can promote the development of service FDI to some extent. Francois and Woerz (2008) emphasise the importance of non-trade service inputs in the production of trade manufacturing. As a downstream industry of the service industry, the manufacturing industry can promote the development of the service industry and attract FDI. At the same time, the openness of the service industry is a potentially decisive factor for the efficient development of most technology-intensive manufacturing industries.

Another determinant of FDI is generally referred to as 'agglomeration economies'. According to Glaeser's (2010, p. 1), agglomeration economies can be defined as "*.. the benefits that come when firms and people locate near one another together in cities and industrial clusters. These benefits all ultimately come from transport costs savings: the only real difference between a nearby firm and one across the continent is that it is easier to connect with a neighbour*". Thus, a region within a country (or a province in China) has an industrial agglomeration economies effect, when as more firms in related fields of production cluster together, their costs decline significantly and, as a result,

the obtained cost advantage and technology spillover effect is likely to attract even more FDI to the region.

Since agglomeration economies tend to produce a virtuous circle, FDI is expected to form a cumulative mechanism; accordingly, past FDI inflows are expected to generate future capital inflows. This means that countries that have already attracted FDI are likely to continue to do so (Nachum, 2000). Due to the advantages of the knowledge base and geographical concentration, Zhang and Yang (2018) state that professional agglomeration could promote the match between transnational corporations and local enterprises and thus enhance the innovation ability of local firms/industries. After the matching with MNCs, the labour market is enriched, talents in various professional fields are exchanged, and the dissemination and sharing of knowledge and information in FDI are further accelerated (ibid). Compared with specialised agglomeration, diversified agglomeration can drive the overall technological progress of various industries in a region and promote the spread of FDI spillover effects more pervasively. The technology spillover effect of the earlier foreign investment will be helpful to attract foreign capital and FDI in the future. Seongkyoon (2014) underscores that there is a convergence of technology between MNCs and domestic companies. Basant and Fikkert (1996) add that the technology spillover effect brought by FDI has a positive impact on the R&D capability of local enterprises. However, the empirical evidence is not unanimous. For example, Djankov and Hoekan (2000) find that the spillover effects of FDI are not statistically significant. A similar result is obtained by Haddad and Harrison (1993) through employing a unique panel dataset at firm-level in Morocco's manufacturing sector.

The host country with abundant natural resources (such as minerals, forests, fisheries, arable land and water) has the advantage of attracting resource-seeking FDI. Foreign companies usually utilise local natural resources of host countries through FDI. By analysing the data of FDI in Nigeria from 1970 to 2006, Dinda (2014) finds that the main motive of foreign enterprises' investment is that of seeking natural resources. The results also show that the trading partners of the UK in the North-South (N-S) and China in the South-South (S-S) trading relationship, have a strong influence on the outflow of natural resources from Nigeria. For some specific natural resources, MNEs could locate

production facilities in the host country and use the local natural resources to produce final products. For example, Japan is relatively short of natural resources, and it therefore struggles to meet the needs of natural resource dependence or expanded production in the primary product processing industry. As a result, many Japanese MNCs invest in other countries and use the host country's abundant natural resources to produce or import relevant products (Pak and Park, 2005). By analysing China's two largest oil companies, the state-owned China National Petroleum Corporation (CNPC) and the private Sinopec, their respective overseas investment transactions in 2002 and 2010, show that China National Petroleum Corporation is more interested in investing in natural resources, and Sinopec is mainly focused on acquiring strategic assets.

The primary motivation of tax avoidance investment is to avoid high taxes in the home country and transfer economic activities to host countries offering tax havens. Choosing to invest in these tax havens can reduce costs and generate excess profits. Based on a database of 14,209 MNEs in 12 OECD countries, Jones and Temouri (2016) support empirically the contention that the use of tax-haven subsidiaries could become more widespread in the future. Moreover, MNEs with high levels of intangible assets from high-tech manufacturing and service industries are more likely to make use of tax havens. If the future growth of the world economy is to be driven by high-tech MNEs, this will have a significant impact on the OECD's corporate tax base. Markusen (1984) employed a general equilibrium model of MNEs based on a multi-factory operation economy to explain the motivation of FDI. One of the purposes of MNEs investing in foreign countries is to avoid high transport costs or trade protection mechanisms in host countries. Another purpose is to transfer some of the production chains to overseas countries to take advantage of lower labour costs (ibid). Using panel data on foreign subsidiaries of German MNEs from 1999 to 2010 for empirical testing, Egger et al. (2014) found that the investment of tax avoiders has no response to the income tax of the host country, while the investment of non-tax avoiders is sensitive to the income tax of the host country. From the results of this study, the consequences of taking measures to prevent tax avoidance in a country will depend on the composition of the subsidiaries that conduct cross-border investments in the country. Preventing tax avoidance, such as the transfer of profits from an MNE, would increase the income tax of the country while other conditions remain the same. Following Becker and Fuest

(2011, p. 477), "*If a country increases its taxes, it does not only lose marginal greenfield investment projects, but intramarginal greenfield projects are replaced by acquisitions of existing firms. This reduces the number of new projects in the country and, as a consequence, total tax revenue*".

It is generally believed that host countries with proper regulation and policy are more likely to attract FDI. Political risk, the political governance level and corruption index are commonly used to measure the political system of the host country, and exchange rate fluctuations along with the inflation rate are used to measure the economic policy of the host country. First, the degree of corruption in the host country and other institutional factors can be expected to be harmful to inward FDI. For example, Mudambi et al. (2013) developed an empirical model that correlated national institutional factors with transnational FDI flows by using the data from four different periods of FDI inflows from 55 countries. The empirical results show that the degree of FDI inflows and corruption, are the main determinants of the level of economic regulation, but corruption does not have an independent influence on the level of FDI inflows, but as noted by Egger and Winner (2005), corruption can also in cases act as incentive for FDI. Second, to some extent, FDI may be affected by the host country's environmental regulations. Mulatu (2017) set up a location model, using data on UK MNEs' activities in 64 countries and 23 industries between 2002 and 2006, to investigate the interaction between industry attributes and the host country characteristics in determining a firm's location. The results show that the significant influence of environmental policies on UK's FDI is the 'pollution haven' effect. Moreover, for every standard deviation increase in environmental slack, FDI in industries with higher than average pollution intensity increased by 28 percent.

The prototype of the pollution haven hypothesis (PHH) was originally proposed by Copeland and Taylor (1994) when they analysed the relationship between North-South trade and the environment. The essence of this hypothesis is that under the conditions of an open economy, the result of free trade will lead to the continuous transfer of highly polluting industries from developed countries to developing countries. Under the conditions of full trade liberalisation, the price of the product has nothing to do with the place of origin. However, in the real world, due to the existence of transportation

costs and trade barriers, trade liberalisation has tended to align product prices through arbitrage mechanisms. When the product has a uniform price, the production cost determines the production location. If all countries have the same conditions except for environmental standards, then polluting companies will choose to produce in countries with lower environmental standards, and these countries will become a paradise for pollution. Hence, Copeland and Taylor (2004) also suggested that if environmental regulations weaken competitiveness, and the resulting polluting enterprises migrate to countries with weak environmental regulations, then countries will become mainstream trends in incorporating domestic environmental regulations into the trade sector. To date, there has been a lack of reasonable identification strategies to overcome measurement errors and unobserved heterogeneity problems, and verification of PHH has not yielded reliable results. Although the derivation of PHH seems reasonable, there is no clear empirical evidence to support the veracity/validity of this hypothesis (Poelhekke and van der Ploeg, 2015; Manderson and Kneller, 2012). Despite this, Millimet and Roy (2015) attempt to overcome these problems and use US state data for empirical testing. Their results show that own environmental regulation and FDI inflows have a negative relationship, lending.

Economists often use the 'Gravity Model' to analyse bilateral trade problems between two countries (with the size of the national economy, GDP, representing the quality, and the geographical distance between two countries representing the distance). Anderson (1979) found that trade flows depend on the size of the international economy and geographical distance, and use the Gravity Model to describe the investment flows. Based on Anderson's (1979) analysis, Brainard (1993) combined the study of FDI with the Gravity Model. According to Anderson (1979), the derived gravity model related to investment flows is:

$$M_{i,j} = \beta_0 (Y_i)^{\beta_1} (Y_j)^{\beta_2} (N_i)^{\beta_3} (N_j)^{\beta_4} (d_{i,j})^{\beta_5} \varepsilon_{i,j}$$

where $M_{i,j}$ represents the investment flows between the two countries or regions, Y_i and Y_j are incomes in country i and country j, N_i and N_j describe the population in the two countries, $d_{i,j}$ is the distance between countries or regions j. The $\varepsilon_{i,j}$ represents the lognormally distributed error.

Many researchers have tried to add variables to the thus derived gravity model. Based on the theory of international investment, the gravity model was used to analyse the influencing factors and location selection of FDI of MNEs (Fan, 2016). From the perspective of the location factors of the host country, the investment gravity model represents the investment attraction of the local environment to MNEs. At the same time, for MNEs, the application of this model would help enterprises to determine which host country is the best choice to invest in. In addition, from the perspective of the host country, the application of this model is conducive to the adjustment of location factors (productivity, the skill level of local workers, etc.) and policies of the host country, so as to attract FDI (Liu et al. 2016; De Mello-Sampayo, 2007).

Two additional potential determinants of FDI are worth highlighting. The role of the exchange rate and intellectual property rights (IPRs). Starting with the former, up until the 1980s, the conventional view proclaimed the impossibility of a link between Exchange Rates (ERs) and FDI. Aliber (1970) was the first to postulate that countries with strong currencies would be inclined to invest in weak currency countries. Yet, currency fluctuations are more likely to explain the timing of FDI rather than its causes or trends plus *greenfield capacity* is unlikely to be influenced by short-term considerations such as currency valuation. This is because greenfield FDI requires a long gestation period and currencies tend to fluctuate up and/or down on a daily basis. Froot and Stein (1991), Campa (1993) and Blonigen (1997) also proposed different explanations postulating a positive or negative relationship between the ER level and FDI but the empirical evidence is mixed (see, for example, De Vita and Abbott, 2007; and Abbott *et al*., 2012), though ER volatility, by increasing uncertainty, has been found consistently to discourage FDI.

IPRs have also received attention as a potential determinant of FDI in both the theoretical and empirical literature. Yet, this relationship too remains ambiguous, unproven and seemingly dependent on a number of factors, including the sector of investment. As pointedly noted by the recent review article by Noon *et al.* (2019), conflicting theoretical predictions, positive as well as negative, on how the strength of a country's IPR system can affect MNCs' FDI location choice have been hypothesised over the years, and the empirical literature is equally contradictory and inconclusive.

3.6 Empirical studies

Producer services FDI

Conceptually, Dunning and Frank (1989) stated that manufacturing FDI and services FDI have basically the same influencing factors on country location selection. Many scholars extend the above conclusions through empirical analysis, for example, factors that have been found to be significant determinants of FDI in producer services include high industrial concentration, a large export volume of trade in producer services, massive production advantage of producer services, the rapid development of the manufacturing industry, and a large number of high-tech talents (Chen and Wang, 2011; Fu and Wang, 2014).

Among the subdivision of producer services FDI, FDI in the financial sector has attracted extensive attention from many researchers. Williamson (2002) used the "defensive expansion" to describe banks' overseas expansion strategies (follow the customers) such as the US and Europe. The international expansion could not only maintain the relationship between banks and their customers but also establish business activities in new regions to earn greater profits. At the same time, in the presence of competitors, banks could also protect their business with existing customers by following them to the new region (Kindleberger, 1983). Aliber (1984) also reached the same conclusion that the US could meet the overseas financial needs of American MNEs and to maintain long-term business relations with existing customers through FDI.

It is easier to set up industrial clusters in regions where producer services are highly concentrated, thus attracting more FDI. For instance, Bagchi-Sen (1991) investigated the rapid growth of producer-services FDI such as finance, insurance and real estate in the US. Studies have shown that foreign service companies tend to invest in places where local producer-service industries are highly concentrated, with the aim of establishing markets and economies of scale. Yang and Liu (2012) state that there is a correlation between FDI in producer services, the market size and market growth potential. However, information transmission, computer services and software industries, scientific research, technical services and geological exploration industries,

were not found to facilitate FDI inflows. Li and Moshirian (2004) claim that the better the financial development of the host country, the more FDI such country would attract in the insurance services field.

The increase of exports in the producer-service sector has a positive effect on attracting FDI. For example, the export trade in the producer services industry had also facilitated economic integration with areas outside of North-Eastern Ohio, driving the growth of FDI in the US service industry (Goe, 1990). By building a VAR model, Chen and Wu (2017) analyse the data of China's financial trade export and financial sector FDI between 1999 and 2015. The empirical results show that there is a long-term equilibrium relationship between financial service trade export and financial FDI. According to the impulse response function and variance decomposition graph, the contribution rate of FDI in financial industry to financial service trade has been in a slow rising state. Moreover, the contribution rate of FDI in financial service trade to the export of financial service trade shows a decrease followed by a slow increase.

In addition, Markusen et al. (2005) argue that foreign producer services can provide substantial benefits for domestic firms. Building on earlier monopolistic-competition models of intermediate producer services, their results show that: "*1) while foreign services are partial-equilibrium substitutes for domestic skilled labour, they may be general-equilibrium complements, (2) service trade can provide crucial missing inputs that reverse comparative advantage in final goods, (3) the 'optimal' tax on imported services may be a subsidy, and (4) in our dynamic formulation, there may be earnings losses for immobile workers along a transition path that suggest potentially important equity consequences of reform*" (Markusen et al., 2005, p. 758).

After 1980, with the tide of total factor division of labour sweeping the world, MNCs integrated and utilised the helpful resources of various countries in the global scope through FDI. Under the influence of economic globalisation, developed countries occupy the international market share by their advanced technology, knowledge, human capital and other high-end producer services. At the same time, MNEs in developed countries are also actively expanding overseas and transferring their production links to some developing countries. As for the developing countries, the

advanced production factors (such as high technologies) are strategic assets which are necessary for the producer service industrial upgrading. Therefore, many developing countries take the initiative to make FDI to developed countries to acquire advanced technologies, innovative resources and other strategic assets, to promote the industrial upgrading of producer services in their own countries. Wu and Yin (2016) argue that there are apparent differences between developing countries' reverse FDI (from the South to the North) and FDI in the general sense. However, 'reverse FDI' is not based on the ownership advantage of industrial technology and management but is an investment with the primary goal of obtaining strategic assets from developed countries.

Foreign enterprises contract their non-competitive advantages to enterprises with production advantages in host countries by means of "producer service outsourcing". Hanssens *et al.* (2013) contend that the degree of externalisation of the "non-professional" part of the production process is increasing (including the provision of accounting, management consulting and legal producer services). This vertical split leads to a densely networked "regional economy" because spatial proximity ensures that transaction costs can be minimised and attracts FDI in services. Stare (2001) believes that Slovenia should use FDI as a means of promoting the development of producer services. In other words, the spillover effect of FDI in business services could improve the management, organisation and sales expertise of the producer services sector in that country.

The population of producer service companies has a significant connection with manufacturing companies regarding initiation rate and density. Through estimating Japan's FDI inflows data of the financial services trade between 1990 and 1994, Yamori (1998) concludes that the economic scale of manufacturing FDI in the host country is an essential factor for the location selection of Japanese financial MNCs. Tang and Xu (2008) found that, for co-evolution, the increase in population density of manufacturing companies may increase the population density of producer service companies. Fernandes and Paunov (2012) support the hypothesis that the spillover effects of FDI in services may have special significance for the development of other industries. Moreover, reducing barriers to FDI in services in many emerging and developing

economies could help to improve total factor productivity (TFP) in the host countries' manufacturing sectors.

A lack of a supporting policy often brings some obstacles to FDI into the host country market. Also, some producer services MNCs may face many obstacles, such as government and cultural barriers and information barriers when they enter foreign markets. Based on panel data of US FDI in 25 host countries from 1976 to 1995, Raff and Von der Ruhr (2001) investigate the investment pattern of FDI in producer services. The empirical results show that in addition to government and cultural barriers, production service companies may face information barriers when entering foreign markets. However, the existence of these barriers indirectly proves that producer services industry FDI tends to follow FDI in downstream industries. Jensen et al. (2007) developed a small, innovative, open-economy model for a computable general equilibrium of the Russian economy, in which the most significant gains for Russia (accession to the WTO) would come from the liberalisation of barriers to multinational service providers. The Vietnam government actively enacted laws and successfully improved policies to promote the economy of Vietnam (Anwar and Nguyen, 2010). The most important policy changes affecting FDI inflows and private sector activities in Vietnam include the introduction of the Foreign Investment Act in 1987, its accession to the association of South-East Asian nations in 1995, the US-Vietnam bilateral trade agreement in 2001, and its membership to the World Trade Organization (WTO) in 2007 (Nguyen and Ye, 2014).

Table 3.6: Previous empirical studies in producer services FDI

Author(s)	Subject	Estimation Methods	Independent Variables	Results
Kindleberger (1983)	187 large U.S. multinational enterprises, 1948-1967. Time series data	Basic analytical measure: Entry Concentration Index (ECI)	Industry concentration, the countering of rivals' FDI, product diversity, intensity both of R&D and of advertising as a percentage of sales	Positive effect (on the whole ECIs)
Aliber (1984)	Q ratios (the ratio of market value to book or replacement value) for national banking system between 1974 and 1982	Survey (General data calculation)	Aggregate Q ratio, national Q ratio, international bank Q ratio and world Q ratio	Data presented in this paper suggest that banks headquartered in countries in which Q ratios are high appear better positioned to expand abroad.
Goe (1990)	1397 business establishments from producer services industries located in the four metropolitan statistical areas of northeast Ohio (a state in the northeastern U.S.) between 1974 and 1986	Survey (General data calculation)	Percentage of government agency and public institution customer, percentage of total revenues derived from government agencies and public institutions, percentage of business customer and percentage of total revenues derived from business	Positive effect

Bagchi-Sen (1991)	FDI transactions in the United States between 1984 and 1983. Time series data	Ordinary Least Squares (OLS)	The share of employment in the domestic finance, insurance, and real estate sector (FEMP), the share of metropolitan population in a state (METR), the rate of change in population (PCH) and the value per parcel of commercial and industrial property (CIVAL)	Positive effect (the effect of METR is positive but not statistically significant)
Yamori (1998)	The annual data of Japan between 1990 and 1994. Firm level data	OLS	The demand of Japanese manufacturing industry for financial services and measures of the local banking opportunity	Positive effect
Raff and Von der Ruhr (2001)	U.S. FDI in 25 host countries from 1976 to 1995. Panel data	OLS, GLS and REM	The stock of manufacturing FDI, real GDP, real GDP/Capital, Subjectively Created index, Transparency International Index	Positive effect; Negative effect (Subjectively Created index)
Stare (2001)	The annual data of Slovenia between 1995 and 1998. Firm level data	General data analysis	Value added per employee in market services, weight of business service enterprises with foreign ownership (EFO) in business services and performance indicators in business services.	Positive effect

Li and Moshirian (2004)	FDI in insurance services in the U.S. between 1987 and 1998. Time series data	OLS and GMM	The national income, relative cost of capital, relative wage rate, total trade in insurance services, exchange rate variability, FDI in banking, source counties' insurance market size; and US financial development.	Positive effect
Jensen et al. (2007)	Russia, 2004. Survey data	Systematic Sensitivity analysis	Tariff rates, export taxes rates, estimated change in world market price, barriers to FDI	Negative effect
Tang and Xu (2008)	China, 152 sample firms of producer service suppliers and 484 sample firms of manufacturers in 2007	The contagion model, the density dependence model, the dual density dependence model	Taken statistics of sample firms of two industry populations, they obtained two figures which depict the changes of founding rates and population densities with date	Positive effect (the population of producer-service firms); negative effect (population density of manufacturing firms)
Anwar and Nguyen (2010)	61 provinces of Vietnam from 1996 to 2005. Panel data	GMM	Human capital, learning by doing, exports, macroeconomic stability, level of financial development, public investment, market size, infrastructure development, labour market conditions, the level of openness and GDP	Positive effect

Chen and Wang (2011)	10 provinces of China, 2004-2009. Panel data	Durbin-Wu-Hausman test, fixed-effects model and random-effect model	Potential of economic growth，the scale of FDI in manufacturing，the labour cost and the degree of marketisation	Positive effect
Fernandes and Paunov (2012)	An unbalanced panel capturing firm entry and exit that includes an average of 4913 Chile's firms per year for the 1992–2004 period. Manufacturing firm-level data	OLS	Service FDI linkage based on service FDI stocks, manufacturing FDI Linkage based on manufacturing FDI stocks, mining FDI linkage based on mining FDI stocks and the export dummy	The estimates show a positive and significant effect of service FDI penetration on firm TFP.
Yang and Liu (2012)	20 provinces of China, 2004-2010. Panel data	Frist-order difference GMM (DIFF-GMM)	The market size, the market growth potential, the average wage levels, the number of skilled workers, infrastructure, government intervention and the degree of openness	Positive effect
Hanssens et al. (2013)	APS (advanced producer service) procurement 300 largest companies located in Belgium between 7 June and 22 November 2009. Firm level data.	Questionnaire (general data calculation and analysis)	Accountancy and audit, advertising, financial services (banking and insurance), law, management consultancy	Positive effect

Fu and Wang (2014)	17 provinces of China, 2005-2012. Panel data	Generalised Least Squares (GLS)	GDP, GDI, capital stock, the number of labour force, economic growth and technological progress	Positive effect
Nguyen and Ye (2014)	Historical data were gathered from the Mekong Delta of Vietnam from 2007 to 2011.	SPSS statistical software was used to calculate the initial eigenvalues, the contribution rate and the cumulative contribution rate,	Economy factors, society factors and environment factors	Positive effects
Wu and Yin (2016)	The annual data of China between 1995 and 2014. Time series data.	OLS	The real effective exchange rate， the volume of international trade，the number of international labour and FDI	Positive effect
Chen and Wu (2017)	The annual data of financial services FDI in China from 1999-2015. Time series data	Impulse Response Function and Variance Decomposition Method	Financial services trade import and export	Positive effect

Source: the above table 3.6 is based on author's research

3.7 Conceptual framework

There has been limited published research focusing specifically on producer services FDI location choice in China (Yin et al., 2014). Furthermore, this limited research mostly concentrates solely on specific industries such as insurance and financial institutions (which are part of the service sector). Using panel data for 17 provinces from 2000 to 2010, Yin et al. (2014) find that growth potential, purchasing power, development of service industry, wage costs and agglomeration effects have a significant impact on FDI inflows to the service industry in China. They also find that 'market-seeking' and 'client-following' are the two most important motives for FDI inflows in services. However, they admit that a limitation of their study is that it is based on a relatively small sample and they do not account for the heterogeneous nature of business activities within the services industry using data at the sub-sector level. Wu and Strange (2000) employ a conditional logit model regression to investigate the determinants of location choice of foreign insurance companies in China and use a sample of 138 foreign representative offices from 1992 to 1996. They find that the openness for the award of operating licenses, current and future market demand, and the presence of other foreign investments, have a significant impact on the choice of location while wage costs and infrastructure considerations were found to be of little significance. Similarly, using a logit model, He and Yeung (2011) investigate the locational distribution of foreign banks in China in 2006 across 32 cities. Their results suggest that smaller foreign banks tend to pursue a 'follow-the customer' strategy to lower investment risks and maintain business–client networks in their choice of Chinese cities. Large foreign banks have ownership advantages and tend to use the 'follow-the-competitor' strategy to select cities with large potential banking opportunities. Chen et al. (2014) use data from the 2004 China economic census and find that a city's urban economy, involvement in the global market, and telecommunication infrastructure, have a significant impact on foreign financial

business location choice. They also find no significant link between foreign financial institution's market entry and the size of domestic financial centres.

In summary, and on the basis of the above rationalisation, although many empirical studies have examined the determinants of FDI in manufacturing, services or both, much less attention has been devoted to the factors influencing specifically FDI in producer services, particularly in the context of China, leaving a glaring gap to be filled by our study. Accordingly, the first hypothesis this PhD thesis will test is the following:

Hypothesis 1: The determinants of China's FDI inflows in the producer services sector are different from the general determinants of China's FDI inflows (using national level time series data).

It should be noted at this point that the FDI and PSFDI data used for the estimations to test H1 will be national level data obtained from China's Ministry of Commerce. Yet, in an article examining the challenges to the Chinese data gathering and reporting process, Owyang and Shell (2017) recently observed that although China's data quality and collection practices have improved, "*due to the country's complex economy and challenges posed by the transition from a command economy to a market economy, China's economic statistics remain unreliable."* (ibid, p. 8). Accordingly, prior to moving to testing H3 using sub-sector PSFDI data, we wish to subject the results obtained for H1 to further scrutiny using alternative panel aggregate data drawn from 26 Chinese provinces, including PSFDI data obtained from the Chinese Provincial Statistical Yearbooks, with a sample period from 1997 to 2017. Furthermore, given the use of provincial level panel data, we employ fixed and/or random effects panel regressions, which allow us to establish how method dependent the results to be obtained from testing H1 are to the ARDL cointegration technique used. Finally, this permutation allows us to extend our model specification by including additional variables thanks to the enhanced provincial level data availability. On these bases, the second hypothesis to be subjected to empirical scrutiny is:

Hypothesis 2: The determinants of FDI inflows in the producer services sector are different from the general determinants of FDI inflows (using provincial level panel data).

Testing H2 by pooling data drawn from the different Chinese provinces is also justified by the fact that, as noted by Yin et al. (2014), there is an uneven spatial distribution of FDI, and China's characteristics of its investment environment vary across Chinese regions. Hence, analysing provincial level data of FDI and PSFDI may offer even more valuable and reliable evidence from which to gain insights of the determinants of producer services FDI in China.

The determinants of FDI have been studied comprehensively in previous theoretical and empirical research (see, for example, the reviews by Agarwal, 1980; De Vita and Lawler, 2004; Abbott *et al.*, 2012). Also, several studies have investigated the determinants of FDI in China (Wang and Swain, 1995, Sun *et al.,* 2002, Barros *et al*., 2013, Belkhodja *et al.,* 2017) and find that variables such as GDP, human capital, level of infrastructure development, openness and agglomeration economies, have a significant impact on FDI inflows. However, if we look at the composition for the measure of general FDI (aggregate of all three sectors: primary, secondary and tertiary), it is highly skewed towards the secondary sector, i.e. the manufacturing sector (see Figure 2.11 and Figure 2.12 presented in Chapter 2). However, FDI in each sector has different characteristics in terms of motivation. For example, Yin *et al.* (2014) indicate that FDI inflows in the primary sector are the most labour intensive, and that FDI inflows in the secondary sector are more labour intensive than those in the tertiary sector. It follows that previous findings on the determinants of aggregate FDI flows may not explain the determinants of producer services FDI. For example, Yin et al. (2014) suggest that the service industry - especially the banking, insurance, security, consultancy, and IT services sub-sectors - generally have higher requirements on human capital and a labour force with higher level of skills and experience. Therefore, it is reasonable to expect that the significance and magnitude of determinants of

producer services FDI may vary from general FDI across sectors and or sub-sectors. Accordingly, this thesis will investigate *Hypothesis 3*:

Hypothesis 3: The determinants of Chinese producer services FDI inflows may differ across sub-sectors of producer services.

Hypothesis 3, therefore, focuses on investigating whether the determinants of producer services FDI vary across sub-sectors. Major components of the services sector are shown in Chapter 2 and listed in Table 2.6 and Figure 2.12. They clearly show the heterogeneous nature of the activities which comprise the services sector (Charles, 1993). We could, therefore, expect that the determinants of producer services FDI may vary across producer services sub-sectors. Moreover, Yin et al. (2014) call for further research at sub-sector level. We too would expect that the important factors that influence producer services FDI inflows may vary among different economic sub-sectors. For example, Wheeler and Mody (1992) find that factors important to FDI in the electronics industry may not be important to the manufacturing industry as a whole. They find that factors such as tax rates, domestic risk and openness exhibited little influence on FDI inflows in the electronics industry, while agglomeration and infrastructure quality dominate FDI inflows in the manufacturing industry.

3.8 Chapter Summary

The first section of this chapter introduced the concept of FDI and discussed the definitions and classification methods of FDI by some world organisations and early scholars. It was shown that with the passing of time, the main feature of the definition and measurement of FDI have changed, from 'control' to 'lasting interest'. The chapter also examined the definitions and classification of producer services and producer services FDI. Compared with the conventional FDI, FDI in producer services is mainly concentrated in knowledge-intensive industries. Next, the chapter offered a critical synthesis of selected theories of FDI. Because of its complexity, scholars often have

different views on these theories. Although most if not all of these theoretical postulations relate to general FDI, some may pertain to FDI in producer services. But insufficient evidence is available to make such a determination. Hence, to clarify the location determinants of FDI in each sub-sector of the producer services industry, it is necessary to conduct an empirical analysis of FDI in the producer services sector, further disaggregated at sub-industry level.

The chapter culminated in the development of the main conceptual framework - distilled from the knowledge and gaps that emerged from the critical review of relevant theoretical and empirical literature - comprising the three hypotheses to be subjected to empirical scrutiny later in this thesis. The next chapter will concentrate on the data and methodology to be employed for the empirical analysis.

Chapter Four: Methodology

4.1 Chapter Overview

This chapter describes and justifies the econometric framework employed in this PhD study. It begins by discussing the epistemological and ontological positioning of the present research in the context of the scientific methodology of econometrics that is used in this study. Next, it introduces the general concepts of econometrics and regression analysis, to then go on to distinguish between time series analysis and panel data analysis, both of which are used to test the three hypotheses constituting the analytical framework of this thesis to be subjected to empirical scrutiny. Next, as part of the time series analysis employed to test Hypothesis 1, the concept of stationary time series is discussed along with an illustration of the unit root tests that are used in the empirical analysis. The concept of cointegration is then examined in detail with special attention being paid to the Auto Regressive Distributed Lag (ARDL) bounds testing approach to cointegration that is adopted. The chapter then examines the panel data (China's provincial-level panel data) econometric approach that is used later in the empirical analysis to test Hypotheses 2 and 3, alongside the diagnostic tests employed. Next, the chapter describes the data collected for empirical analysis, outlines some of the most salient data and methodological limitations, and offers the researcher's considerations with respect to ethical issues. A chapter summary concludes.

4.2 The Scientific Methodology of Econometrics and the Epistemological and Ontological Positioning of this PhD Study

This section intends to clarify the *epistemological and ontological choices* made in this research, specifically, how the researcher engaged with the process of deciding on the viewpoint to be taken when considering the nature of reality and the nature of knowledge; a viewpoint that is inherently and inextricably connected to the nature of the field of econometrics.

The field of 'econometrics' can be said to have gained its official, distinctive status with the founding of the Econometrics Society in 1933, which defined econometrics as "*economic theory in its relation to statistics and mathematics*" (Frisch, 1933, p. 1) with, as its purpose, the "*unification of the theoretical-quantitative and the empirical-quantitative approach to economic problems*" (ibid, p. 1).

Maddala (1988, p. 3), provides a more recent definition of econometrics as follows: "*The application of statistical and mathematical methods to the analysis of economic data with a purpose of giving empirical content to economic theories and verifying them or refuting them*".

The above definitions should suffice in clarifying that the task of econometrics starts by drawing from economic theory to then specify measurable mathematical models that are, finally, empirically tested. A crucial distinction between econometrics and statistics is in order at this point. Econometrics is concerned with establishing causality (or causation) whereas statistics only deals with correlation. As eloquently emphasised by Heckman (2000, p. 45):

> *Most econometric theory adapts methods originally developed in statistics.The major exception to this rule is the econometric analysis of the identification problem and the companion analyses of structural equations, causality, and economic policy evaluation.*

Hoover (2005) highlights four specific roles of econometrics. First, to test theoretical implications. Second, to measure unknown values of theory-based parameters (related to the impact of underlying variables). Third, econometrics may be used to forecast future values of a variable. Fourth, it may be used to characterise a relationship or economic phenomenon. In this PhD thesis, econometrics will be used for all these purposes with the sole exception of forecasting, the third role highlighted within Hoover's (2005) framework.

Given the above, epistemologically speaking (in terms of the philosophy of knowledge), the scientific methodology that appears most relevant to the econometric methodology used in this PhD study is *logical positivism* (a school of thought that grew out of the Vienna Circle in the 1920s), according to which scientific knowledge has two sources: deductive inference from theoretical axioms, and inductive inference (and theory development) from empirical data. In this thesis, the *deductive approach* to inference will be adopted. Theoretical propositions leading to theory-based, testable hypotheses will be derived from the critical review of relevant literature on the determinants of FDI and producer services FDI, and these hypotheses will then be empirically tested through the econometric methodology.

Hacking (1983, pp. 41-42, cited in Hoover, 2005) specifies six distinctive features of logical positivism, as follows:

> *(1) An emphasis upon verification (or some variant such as falsification):*
>
> *Significant propositions are those whose truth or falsehood can be settled in some way. (2) Pro-observation: What we can see, feel, touch, and the like, provides the best content or foundation for all the rest of our non-mathematical knowledge. (3) Anti-cause: There is no causality in nature, over and above the constancy with which events of one kind are followed by events of another kind. (4) Downplaying explanations: Explanations may help to organize phenomena, but do not provide any deeper answers to Why questions except to say that the phenomena regularly occur in such and such a way. (5) Anti-theoretical entities: Positivists tend to be non-realists, not only because they restrict reality to the observable but also because they are against causes and are dubious about explanations. . . (6) Positivists sum up items (1) to (5) by being against metaphysics.*

The epistemological stance of *logical positivism* just described, provides the philosophical positioning of this PhD study. Ontologically, in terms of 'the nature of being', this philosophy maintains that the world or reality is external (not socially constructed) and that there is a single objective reality to be uncovered by the research irrespective of the researcher's beliefs. This ontological perspective calls for controlled experiments to be conducted by employing a suitable scientific methodology, such as econometrics with respect to economic phenomena, which allows the researcher to adhere to well established, rigorous research techniques to uncover single objective reality (here, robust results about the determinants of producer services FDI in China and its provinces, at aggregate and sub-sector level).

4.3 Econometrics and Regression Analysis Using Time Series and Panel Data Models

As explained above, the overarching quantitative methodology employed to test the three hypotheses defining the empirical framework of this study is known as 'econometrics', which - broadly speaking - is concerned with the measurement of economic relationships. Econometric analysis proceeds along the following lines. First, economic theory makes statements that are mostly qualitative in nature. In the case of this thesis, the three hypotheses have been distilled after a careful review of the theoretical as well as applied/empirical literature. Then, the econometric model or models to test the hypotheses are specified and an appropriate time series or panel econometric technique chosen to test the hypotheses in question. After relevant data for all the variables are collected, estimation of the parameters of the chosen model or models is undertaken through 'regression analysis' to give way to verification and statistical inference of the results obtained. As noted by Guijarati (1988), regression analysis is concerned with the estimation of models where one *dependent variable* is expressed as a linear function of one or more other variables, called *explanatory variables* or *regressors*. It is important to note that although regression analysis assumes a causal relationship, it does not imply one. A causal connection between variables must

be inferred from theory. It is also useful to point out the distinction between regression analysis and correlation analysis, where the primary aim of the latter is merely to measure the strength or degree of association between or among variables.

In the econometric analysis to be carried out in this PhD study, two types of regression models will be used, time series and panel data models. Time series data regressions are techniques that estimate data (parameters) of variables over time, whereas panel data regressions estimate parameters of data models that combine cross-section data (data of numerous provinces of China in our case) with time-series data (over the sample period, at quarterly or annual frequency).

4.4 Time Series Analysis

4.4.1 Unit root tests

Using time series data in econometric analysis often requires the series to be stationary. If any of the series (variables) is non-stationary or if any of the variables contain a unit root, then running a regression model using standard estimation techniques such as Ordinary Least Squares (OLS) might produce a spurious regression problem (see Granger and Newbold, 1974). In such cases, spurious regression results may erroneously suggest a statistically significant relationship between economic variables even when, in fact, there is merely a contemporaneous correlation between the variables, not an economically meaningful causal relationship. It is, therefore, paramount to test the series (variables) for the presence of unit roots in order to avoid the problem of spurious regression (Harris, 1995). A time series can be said to be stationary if it "*tends to return to its mean value and fluctuate around it within a more-or-less constant range (i.e., it has a finite variance), while a nonstationary series has a different mean at different points in time (and thus the concept of mean is not really applicable) and its variance increases with the sample size*" (Harris, 1995, p. 15). According to Gujarati (2009), a stochastic process, Y_t, is stationary if it possesses the following properties:

$$E(Y_t) = \mu \quad (1)$$

$$\text{var}\,(Y_t) = E\,(Y_t - \mu)^2 = \sigma^2 \quad (2)$$

$$\gamma_k = E\,[(Y_t - \mu)\,(Y_{t+k} - \mu)] \quad (3)$$

Here, *stationarity* means that the mean (see Equation 1) and variance (see Equation 2) of a time series (variable), are constant over time. Moreover, the covariance (see Equation 3) depends only on the lag between the two time periods (*k*).

A unit root test is a test conducted to detect whether a time series is stationary, i.e., integrated of order zero (I (0)) or non-stationary (integrated of order 1 or higher order). There are several approaches available to test for the presence of a unit root in time series data. The most widely employed technique is the Augmented Dickey-Fuller test (see Said and Dickey, 1984). The ADF test is an evolved version of the standard Dickey-Fuller (DF) test, but 'augmented' by means of the inclusion of additional lags (values of previous time periods, such as t_{-1}) for the purpose of removing autocorrelation in the Data Generating Process (DGP). The ADF test has proven to be an appropriate test for large and complicated time series models. The ADF test equations are as indicated in Equations (4) to (6) below:

$$Y_t = \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_t + \varepsilon_t \quad (4)$$

$$\Delta Y_t = \alpha_1 + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_t + \varepsilon_t \quad (5)$$

$$\Delta Y_t = \alpha_1 + \alpha_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_t + \varepsilon_t \quad (6)$$

where t denotes the time period, Δ is the first difference operator, α_1 stands for a constant or intercept term, α_2 is the coefficient of a time trend component, δ is the coefficient that tests whether the series contains a unit root or not, Y_t is the variable whose stationarity property is to be tested/determined (e.g., FDI, GDP or the exchange rate), and ε_t is the error or disturbance term assumed to be normally and independently distributed with zero mean and a constant variance (i.e., a completely random, or stochastic, 'white noise' process). The ADF tests are based on a regression of Equations

(4) to (6). The text Equation (4) excludes both a constant and a trend. Equation (5) consists of the constant term only, and Equation (6) includes both the time trend and a constant term.

The aim of the ADF test is to investigate whether δ is equal or less than zero in all above three forms. The one-sided hypothesis of the ADF test is shown below:

H_0: $\delta = 0$ (the time series is nonstationary)
H_1: $\delta < 0$ (the time series is stationary)

However, Perron (1989) showed that failure of considering the possibility of the existence of structural breaks or shocks in the time series could lead to lower power of the ADF test, thereby reducing its ability to reject a false unit root null hypothesis. As pointedly observed by Glynn *et al.* (2007), several possible events may lead to structural breaks in the series. As clearly explained by Perron (1989, p. 1361), "*Most macroeconomic time series are not characterized by the presence of a unit root. Fluctuations are indeed stationary around a deterministic trend function. The only 'shocks' which have had persistent effects are the 1929 crash and the 1973 oil price shock*".

To correct for this type of failure, we additionally employ the Narayan and Popp (2010) unit root test which allows for the presence of two structural breaks in the series. The two different test model specifications of the Narayan and Popp (2010) unit root test, are indicated in Equations (7) to (8):

$$y_t^{M1} = \rho y_{t-1} + \alpha_1 + \beta^* t + \theta_1 D\left(T_B'\right)_{1,t} + \theta_2 D\left(T_B'\right)_{2,t} + \delta_1 DU'_{1,t-1} + \delta_2 DU'_{2,t-1} + \sum_{j=1}^{k} \beta_j \Delta y_{t-j} + e_{1t}$$

(7)

$$y_t^{M2} = \rho y_{t-1} + \alpha^* + \beta^* t + \Omega_1 D\left(T_B^{'}\right)_{1,t} + \Omega_2 D\left(T_B^{'}\right)_{2,t} + \delta_1^* DU_{1,t-1}^{'} + \delta_2^* DU_{2,t-1}^{'} +$$

$$\gamma_1^* DT_{1,t-1}^{'} + \gamma_2^* DT_{2,t-1}^{'} \sum_{j=1}^{k} \beta_j \Delta y_{t-j} + e_{2t} \quad (8)$$

where $T_{B,i}^{'}, i = 1, 2,$ denotes true break dates. The selection of the break dates uses a sequential grid search procedure when the absolute *t*-value of the break dummy coefficients is maximised. Δ is the first difference operator, the superscript k denotes the optimal lag length, and e_{it} is the residual, which is assumed to be a "white noise" process (i.e., the errors are assumed to follow a completely random process, and to be normally and independently distributed with zero-mean and a constant variance). $DU_{1,t}^{'} = 1\left(t > T_{B,i}^{'}\right)$ and $DT_{1,t}^{'} = 1\left(t > T_{B,i}^{'}\right)\left(t - T_{B,i}^{'}\right), i = 1, 2,$ denote the dummy variables for breaks in the intercept while the breaks in the slope of the trend function occur at $T_{B,1}^{'}$ and $T_{B,2}^{'}$. Narayan and Popp (2010) tests the unit root null hypothesis of $\rho = 1$ against $\rho < 1$. Equation (7) allows for two breaks in level (M1), and Equation (8) allows for two breaks in level and slope (M2).

4.4.2 Cointegration

The concept of cointegration, for which Clive W. J. Granger was awarded the Nobel prize in 2003, draws on the notion of 'long-term equilibrium'; a notion that critically underpins much of macroeconomic theory and, consequently, poses non-trivial issues for macro-econometric analysis.

The economic interpretation of cointegration is that "*if two (or more) series are linked to form an equilibrium relationship spanning the long-run, then even though the series themselves may contain stochastic trends (i.e., be nonstationary) they will nevertheless move closely together over time and the difference between them will be stable (i.e., stationary)*" (Kennedy, 1995, p. 22). In other words, if two or more time series (variables) move together over time, over the long-run, they can be interpreted to be cointegrated. Time series that are nonstationary, and integrated of order one, may at

times produce a linear combination (based on the residuals) that is stationary (i.e., integrated of order zero, I(0)). In such a case, the series are said to be cointegrated. Previous econometric practice had induced stationarity of series integrated of order one by first differencing the variables. However, doing so removes from the data its long-run properties, making any test for cointegration meaningless. The cointegration approach allows testing for long-run or equilibrium relationships on data (variables) in levels not in first or second difference, thereby preserving the long-run information contained in the level time series.

Many scholars need to be credited for their contribution to the development of the concept of cointegration, which is fairly complex. However, as recently observed by Meuriot (2015), of the many critical contributions to the development of the concept of cointegration, the most significant one is the crucial meeting between Hendry and Granger in November 1975. Meuriot's (2015) article summarises the history and genesis of the concept whilst highlighting the crucial features of cointegration (as noted above), which is worth reporting *ad verbatim*, as follows:

> "*At the beginning, we should mention the work of Alban William Housego Phillips who expressed an interest in macroeconomics. He exploited the mechanisms of equilibrium adjustment and also the control theory [1954; 1957]. Then John Denis Sargan proposed the first "correction to equilibrium" model by putting forward the concept of deviation from the equilibrium path between several time series [1964]. At that time, David Hendry was conducting PhD research under the supervision of Sargan; He was able to ascertain the link between equilibrium correction mechanisms and the spurious regressions presented by Clive Granger and Paul Newbold [1974]. Granger and Newbold determined that nonstationary series led to wrong estimations, i.e. a very high regression coefficient (close to 1) and weak Durbin-Watson statistics [.. which ..] could denote a wrong specification of the*

model because of the autocorrelation between the series – a "spurious regression". Note that unit root tests did not yet exist at that time. So Hendry often challenged Granger on the relationship between Sargan's model and spurious regressions. Finally, the cointegration theory emerged when Granger decided to prove to Hendry that there was no link between equilibrium correction mechanisms and spurious regressions. Granger then thought that an integrated series could not move stationary by any linear combination. For him, the individual autocorrelation of the series was an intrinsic characteristic. As he said it [2004], an integrated series was to remain integrated. He refused the idea that a linear combination between integrated series could modify their intrinsic nature. In fact, he did not yet feel an interest in working on the difference between series (linear combination). However, as he discovered later, if the series evolved in the same way then it was highly probable that the difference between these series would be a new stationary series."

4.4.3 The Engle-Granger and Johansen VAR cointegration techniques

There are several methods that can be used to test for cointegration. The first, introduced by the seminal work of Engle and Granger (1987), is the two-step procedure. Their approach could only test for single equations involving two variables, one dependent and one independent variable. Hence, the Engle and Granger cointegration test cannot be applicable in the present study since the empirical models include more than two independent variables (or regressors). Moreover, the Engle-Granger cointegration test, may be susceptible to small-sample bias (Harris, 1995).

The second cointegration approach was introduced by Johansen (1988) and Johansen and Juselius (1990). The Johansen cointegration technique, has significant advantages over the Engle-Granger two-stage approach. The Johansen cointegration approach

provides a solution to the complication that arises in the presence of multiple cointegrating vectors via the use of a Vector Autoregressive Model (VAR model):

Assume that a set of n ($n \geq 2$) variables are I(1) and hence nonstationary, a generalised unrestricted form vector autoregression (VAR) of order *p* can be represented as:

$$y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + \mu + \varepsilon_t \quad (9)$$

We can re-write the above VAR as:

$$\Delta y_t = \Pi y_{t-p} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \mu + \varepsilon_t \quad (10)$$

where $\Gamma i = -I + A1 + \ldots + Ai$ and $\Pi = -(I - A1 - \ldots - Am)$

The Johansen test approach focuses on the coefficient matrix Π, long-run equilibrium solution, by looking at the rank of Π. The rank of the matrix Π is represented by *r*, which is the maximum number of independent vectors it contains, while *k* represents the total number of variables in the equation. If the variables are not cointegrated, the rank of Π will not be significantly different from zero (i.e., $r = 0$). However, if $0 < r < k$, then there are *r* independent cointegration relationships in the equation. There are two test-statistics proposed by the Johansen method in estimating the matrix Π. They are the trace test and the maximum eigenvalue test.

Despite the obvious superiority of the Johansen cointegration test vis-à-vis the Engle-Granger cointegration approach, the former too can be subjected to criticism. One of the demerits of this approach is that the results are not robust and depend on the optimal number of lags included (Gonzalo, 1994). In addition, an implicit assumption in the application of the Johansen's VAR cointegration technique is that all the variables are integrated of the same order (Pesaran *et al*., 2001). Indeed, the validity of both the

Engle-Granger and Johansen methods is limited by the constraining requirement that all the variables be integrated of order one, i.e., I(1). They cannot be employed if we have a mixture of I(0) and I(1) time series. For example, in the case of the Johansen method, the trace and maximum eigenvalue cointegration tests will no longer be reliable in the presence of stationary variables (Harris, 1995).

4.4.4 The ARDL bounds testing approach to cointegration

Because of the limitations and shortcomings of the cointegration tests outlined above (especially the restriction that all the variables be integrated of order one), this study uses the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration that was proposed by Pesaran and Shin (1998) and Pesaran *et al.* (2001). As noted by Abbott and De Vita (2003, p. 71), the main advantage of the ARDL bounds test cointegration model is that "*it allows testing for the existence of cointegration when it is not known with certainty whether the regressors are purely I(0), purely I(1) or mutually cointegrated.*" That said, the method requires that no variable in the model is integrated of second-order (i.e., I (2)) or higher. Also, endogeneity problems can be avoided when exploring the long-term and short-term relationship between independent and dependent variables. Especially in the regression using a small sample, the ARDL model performs better and is more effective than the standard Engle-Granger two-step method. Even for small samples, the coefficient of the ARDL model is extremely accurate, which further demonstrates the high statistical power of the ARDL model (Pesaran and Shin, 1998). It is because of these advantages that this cointegration technique has been chosen over available alternatives in this study.

David Giles (https://davegiles.blogspot.com/2013/06/ardl-models-part-ii-bounds-tests.html) summarises the advantages of the ARDL bounds testing methodology of Pesaran and Shin (1999) and Pesaran *et al.* (2001) over conventional cointegration testing, as follows:

- *It can be used with a mixture of I(0) and I(1) data.*
- *It involves just a single-equation set-up, making it simple to implement and interpret.*
- *Different variables can be assigned different lag-lengths as they enter the model.*

(https://davegiles.blogspot.com/2013/06/ardl-models-part-ii-bounds-tests.html)

Following the work of Pesaran and Shin (1998) and Pesaran *et al.* (2001), the ARDL(*p*,*q*) cointegration model has the following form:

$$\Delta y_t = \rho + \theta_1 y_{t-1} + \theta_2 x_{t-1} + \gamma z_t + \sum_{i=1}^{p-1} \mu_{1,i} \Delta y_{t-i} + \sum_{i=1}^{q-1} \mu_{2,i} \Delta x_{t-i} + \varepsilon_t \qquad (11)$$

where, time series y_t is the dependent variable and x_t is the independent variable (t = 1, 2, …, T), p and q are the lags, ρ is the constant term, the coefficients $\theta_i, i = 1,2$ correspond to the long-run relationship while $\mu_i, i = 1, 2,$ correspond to the short-run relationship, z_t is a vector of deterministic regressors such as a drift term, and ε_t is an *iid* stochastic process (i.e., a 'white noise' process). The optional lag of the ARDL (*p*,*q*) model is selected on the basis of information selection criteria, such as the Akaike (1998) Information Criterion (AIC) or the Schwarz (1978) Bayesian Criterion (SBC), hence correcting for the residual serial correlation and the problem of endogenous regressors (Pesaran and Shin, 1999).

As noted by David Giles (https://davegiles.blogspot.com/2013/07/information-criteria-unveiled.html), the AIC is a useful tool to select among alternative model specifications. If we let θ* be the Maximum Likelihood Estimator (MLE) of θ, and let $l^* = l(\theta^*) = \log [L(\theta \mid y)|\theta^*]$ be the *maximized* value of the log-likelihood function, then, the AIC can be defined as:

$$AIC = -2l^* + 2k$$

However, it has been suggested in the literature that the AIC could be a biased model selection criterion. Indeed, several studies, including Hurvich and Tsai (1989), have found that the use of the AIC can yield an "over-fitted" model. This may be due to the retention of too many regressors or, in the case of a time-series model, to selecting a lag length that is less than optimal. Nevertheless, this is the information criterion produced automatically since the models specified in our tests do not show risk of over-parameterisation or 'over-fitting' with too many variables.

It is possible to determine if a long-run relationship exists among the variables. The following related null hypothesis is performed on the null hypothesis that the parameters of the lagged level variables in Equation (11) are jointly zero:

H_0: $\theta_1 = \theta_2 = 0$ (long-run relationship does not exist)
H_1: $\theta_1 \neq 0$ or $\theta_2 \neq 0$ (long-run relationship exists)

Pesaran *et al*. (2001) point out that the above null hypothesis could be tested by using a modified F-test. If the estimated value of the F-statistic exceeds the upper bound, the null hypothesis is rejected and the existence of a long-run (level) relationship between the variables is established. If the F-statistic lies below the lower bound, the null hypothesis cannot be rejected ('no cointegration'), and if the F-statistic lies between the critical bounds, the test is inconclusive (see, for example, De Vita and Trachanas, 2016).

We could re-write Equation (11) to represent the reduced form long-run model when the first-differenced variables are jointly equal to zero as:

$$y_t = \beta_0 + \sum_{i=1}^{p} \beta_{1,i}\, y_{t-i} + \sum_{i=0}^{q} \beta_{2,i}\, x_{t-i} + \varepsilon_t \quad (12)$$

From which the long-run coefficient $a_1$can be derived as follows:

$$a_1 = \frac{\sum_{i=0}^{q} \beta_{2,i}}{1-\sum_{i=1}^{p} \beta_{1,i}} \quad (13)$$

Finally, the short-run dynamic coefficients are estimated by the ARDL-Error Correction Model (ARDL-ECM):

$$\Delta y_t = \delta_0 + \sum_{i=1}^{p} \delta_{1,i} \Delta y_{t-i} + \sum_{i=0}^{q} \delta_{2,i} \Delta x_{t-i} + \gamma ECM_{t-1} + e_t \quad (14)$$

where γECM_{t-1} is the error correction term, where the parameter γ having to be statistically significant and negative in order to make the model converge to long-run equilibrium. Effectively, γ shows the speed of adjustment from the short-run towards equilibrium after an exogenous shock to the dependent variable y_t.

4.4.5 Diagnostic tests

It is important to emphasise that the quality of inferences to be made from, and the confidence to be placed on the results of econometric analyses, can be considerably improved by more systematic testing of the models used in order to help identify the strengths or relative weaknesses of these models. In the field of econometrics, these tests are generally referred to as 'Diagnostic tests', which alongside good knowledge of the quality and properties of the data used, help provide reassurances as to the rigour, reliability and validity of the results obtained. Diagnostic tests are, therefore, a critical adjunct to existing methodology.

Various standard diagnostic checks will be employed in the empirical analysis of this PhD study in order to confirm the efficiency and consistency of the model. These include tests for serial correlation, heteroscedasticity, normality of the residuals, and parameter or model stability. The Breusch-Godfrey (Godfrey, 1978) test, tests for residual serial correlation. The residual test model specification is represented by: $\varepsilon_t = \varepsilon_{t-1}\rho + v_t$, $v_t \sim N(0, \sigma_v^2)$, with the null hypothesis being 'no serial correlation' versus the alternative hypothesis of 'serial correlation'. Furthermore, the Breusch-Pagan (Breusch and Pagan, 1979) test is employed to test for heteroscedasticity (non-constant variance) with the null hypothesis being 'constant variance' of the error term versus 'non-constant variance' as an alternative hypothesis. Finally, the Jarque-Bera (Jarque

and Bera, 1980) test is used to test normality in the residuals, with the null hypothesis of 'normality' in the residuals versus the alternative hypothesis of 'non-normality' in the residuals.

It is also important to test the stability of the coefficients of the ARDL model estimation results. Brown *et al.* (1975) proposed two tests, the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares recursive residuals (CUSUMSQ) tests, to assess the stability of the long-run and short-run coefficients. The difference between the CUSUM and CUSUMSQ tests is that the former tests systematic changes in the regression coefficients, while the latter identifies sudden changes from the constancy of the regression coefficients. Turner (2010) specifically investigated the relative power of the two tests, concluding that this depends upon the nature of the structural change that may be occurring in the data. As he puts it: "*If the break is in the intercept of the regression equation then the CUSUM test has higher power. However, if the structural change involves a slope coefficient or the variance of the error term, then the CUSUMSQ test has higher power*." This clarification helps to explain why sometimes the *CUSUM* and *CUSUMSQ* tests generate conflicting findings. As far as the assessment of the test results is concerned, the long-run and short-run coefficients are stable if the plot of CUSUMSQ and CUSUM stay within the 5% critical bounds.

4.5 Panel Data Analysis

In addition to country-level time series data, this study will also investigate the determinants of Foreign Direct Investment (FDI) and Producer Services FDI (PSFDI) by using provincial-level panel data. Accordingly, a brief overview of the panel data analysis regression method used in this study is presented in this section.

Panel (or longitudinal) data refer to data typically involving two dimensions: (i) a cross-sectional dimension, denoted by subscript *i*; and (ii) a time series dimension, denoted

by subscript *t*. Generally, such data can form a balanced or unbalanced panel of N cross-sectional units, $i = 1, ..., N$, over T time periods, $t = 1, ..., T$.

Since the seminal article contribution by Balestra and Nerlove (1966), and especially after Hsiao's (1986) first edition of 'Panel Data Analysis' was published, the proliferation of empirical studies in economics applying panel data methods alongside the development of new techniques for panel data analysis, has been phenomenal.

Several reasons (related to the advantages of using panel data regression methods over cross-sectional or time series methods) can explain the meteoric growth of panel data studies over the past three decades. These include:

i) Large data availability, not just for developed countries but now also across developing countries where there may not have been a long tradition of statistical collection, including China.
ii) A greater capacity to capture the complexity of the phenomenon under investigation through, for example, by allowing to construct and test more complicated behavioural hypotheses about the behaviour of different cross-sectional units of a panel (here, the provinces) over time, thereby capturing the dynamic patterns of the behaviour under study.
iii) Straightforward computational and statistical inference, no more complicated than when using cross-sectional or time series data.

Estimation will be undertaken based on an unbalanced annual data panel, following a standard model specification as presented below:

$$y_{it} = \alpha + \beta X_{it} + \varepsilon_{it} \quad (15)$$

where y_{it} denotes FDI or PSFDI, and X_{it} represents the various determinants of FDI and PSFDI. As pointed out by Greene (2012), panel data analysis is able to capture and provide a more efficient estimation of the variables, since it comprises of both the time series as well as cross-sectional elements of the data, i.e., over time and across units of the panel (in our case, the number of Chinese provinces).

There are three basic panel data models: pooled ordinary least squares (OLS), random effects, and fixed effects models. The Pooled OLS model, is based on the assumption that the sample observations are homogenous (Asteriou and Hall, 2015). It pools all observations together without controlling for the difference between the estimated cross-sectional units of the panel - in our case, the difference across provinces - which may well exist. It is for this reason that this model is avoided. On the other hand, the fixed effects model incorporates unobservable individual effects by control variables that are constant over time but differ across sections/units of the panel.

Therefore, Equation (15) can be re-written as:

$$y_{it} = (\alpha + \mu_i) + \beta X_{it} + \varepsilon_{it} \quad (16)$$

where μ_i represents unobservable individual effects. The fixed effects model assumes the same slopes (α) and constant variance across individual units (μ_i). Since an individual specific effect is constant over time and considered a part of the intercept, μ_i can be correlated with other regressors. Unlike the fixed effects model, the random effects model assumes that the difference across entities is random and uncorrelated with the regressors.

Therefore, Equation (15) can be re-written as:

$$y_{it} = \alpha + \beta X_{it} + (\mu_i + \varepsilon_{it}) \quad (17)$$

where μ_i is an individual specific random heterogeneity or a component of the composite error term, "*the crucial distinction between fixed and random effects is*

whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not" (Green, 2008, p. 183). As is customary in empirical studies, we employ the Hausman test (Hausman, 1978) to choose between fixed or random effects models with the null hypothesis being that the random effects model is appropriate versus the alternative hypothesis that the fixed effects model is appropriate.

In addition, an econometric issue likely to apply across the units of panel data is cross-sectional dependence, which can arise due to spatial effects or unobserved common factors. Accordingly, this study employs a fixed effects method with heteroscedasticity, autocorrelation, and spatial correlation consistent robust standard errors, that was developed by Driscoll and Kraay (1998). A "xtscc" command is available in the STATA program by Hoechle (2007), which is the programme used for the empirical estimations in this PhD study. The "xtscc" procedure first transforms all regression variables at an individual cluster level (in our case for each province). Then, it uses a pooled OLS regression to estimate the within-transformed panel data. The coefficients and their standard errors are robust to very general forms of serial correlation and cross-sectional dependence. As pointed out by Hoechle (2007), this technique has shown better performance than conventional linear panel regression models that do not account for cross-sectional dependence.

4.6 Data

This PhD thesis only uses publicly available secondary data collected from reliable national (Chinese) and international databases. The variables to be included in the respective models to test the three hypotheses (H1, H2 and H3) in this thesis are based on a review of both the theoretical and applied literature on FDI and PSFDI (see literature review chapter).

As discussed earlier in this chapter, the analysis will use time series data models to test Hypothesis 1 (H1) and panel data models to test Hypotheses 2 and 3 (H2 and H3). The respective data are discussed below.

4.6.1 Time series data used to test Hypothesis 1

To test Hypothesis 1 (i.e., to test any differences in location determinants between aggregate FDI and PSFDI), the study uses quarterly time series data from 2003 to 2018, collected from a variety of reliable databases. FDI data comes from the Ministry of Commerce of China. The PSFDI data comes from the Ministry of Commerce of China. The data for the real GDP growth rate is collected from the CEIC China Economic database, and the data for the wage variable comes from the National Bureau of Statistics of China. The data on urban labour market demand is obtained from the Ministry of Human Resources and Social Security of China. The exchange rate of the CNY (the Chinese currency) against US dollar comes from the International Monetary Fund (IMF). Data on the trade variable, representing openness, is collected from the Organisation of Economic Cooperation and Development (OECD). The data used to measure the overall business status of the manufacturing industry comes from the National Bureau of Statistics of China. Data on the growth rate of the Consumer Price Index (CPI) are collected from the National Bureau of Statistics of China. The data on road freight traffic comes from the Ministry of Transport of China. The data of the number of Internet users (dial-up internet access) comes from the Ministry of Industry and Information Technology.

Table 4.1 presents details of the definition of each variable (measure) and the source from which such time series data were obtained.

Table 4.1: Variable Definition and Data Sources for Time Series Data used for Hypothesis 1

Variable	Definition	Data Source
FDI	Aggregate foreign direct investment	Ministry of Commerce of China
PSFDI	Producer services foreign direct investment	Ministry of Commerce of China
GDP	The growth rate of real gross domestic product	CEIC China Economic Database
WAGE	Employee income	National Bureau of Statistics of China
LABOUR	Urban labour demand: skilled professional worker	Ministry of Human Resources and Social Security of China
EXCHANGERATE	Exchange rate (CNY against USD)	International Monetary Fund
TRADE	Imports plus Exports as a percentage of GDP	Organisation for Economic Co-operation and Development
BCI	Business Climate Index (BCI) for manufacturing industry	National Bureau of Statistics of China
CPI	The growth rate of Consumer price index	National Bureau of Statistics of China
MANU	Business Climate Index (BCI) for manufacturing industry	National Bureau of Statistics of China
INFRA	Highway: cargo traffic	Ministry of Transport of China
INTERNET	Number of Internet users: dial-up internet access	Ministry of Industry and Information Technology of China

4.6.2 Panel data used to test Hypothesis 2 and Hypothesis 3

The panel data analysis is conducted using detailed provincial level data, with a sample period from 1997 to 2017. The data employed to test Hypothesis 2 and 3 are obtained from various databases. For the independent variables, the data of aggregate FDI for each province are collected from the Chinese Ministry of Commerce. The sub-sector PSFDI data are obtained from the Provincial Statistical Yearbooks available for 26

provinces, and we do the sum to gain the aggregate PSFDI data. The data for real GDP, trade balance (total value of all imports minus total value of all exports), CPI, commercial property prices, the number of research workers, are collected from the China Statistical Yearbooks. The data for average wages is from the CEIC database. The harmless treatment rate of domestic garbage comes from the Ministry of Housing and Urban-Rural Development of China. The data of the total movement of passengers using inland transport on a given network are obtained from the China Ministry of Transport. According to the "Statistical Classification of Productive Services Industry (2019)" issued by the National Bureau of Statistics of China, the data of six producer services FDI is collected from the Provincial Statistical Yearbooks of 26 provinces in China.

Table 4.2 presents details of the definition of each variable (measure) and the source from which such panel data used to test Hypothesis 2 and Hypothesis 3 were obtained.

Table 4.2: Variable Definition and Data Sources for Panel Data used for Hypothesis 2 and Hypothesis 3

Hypothesis 2		
Variables	Definition	Source
FDI	Aggregate foreign direct investment % of GDP	Chinese Ministry of Commerce
PSFDI	Producer services FDI	Provincial Statistical Yearbooks
GDP	Real gross domestic product	China Statistical Yearbooks
AVERAGEWAGE	Average wage	CEIC database
TRADE BALANCE	Total value of all imports minus total value of all exports	China Statistical Yearbooks
CPI	Consumer price index	China Statistical Yearbooks
RECYCLING RATE	Harmless treatment rate of domestic garbage	Ministry of Housing and Urban-Rural Development of China
RESEARCH WORKER	The number of workers who involved in research activities	China Statistical Yearbooks
PASSENGER TRAFFIC	The total movement of passengers using inland transport on a given network	China Ministry of Transport
HOUSE PRICE	The price of commercial property	China Statistical Yearbooks

Hypothesis 3		
Variables	Definition	Source
TRANSPORTATION & STRORAGE	FDI in transportation and storage activities	Provincial Statistical Yearbooks
FINANCE & INSURANCE	FDI in financial and insurance activities	Provincial Statistical Yearbooks
RENTAL & LEASING	FDI in rental and leasing activities	Provincial Statistical Yearbooks
REAL ESTATE	FDI in real estate	Provincial Statistical Yearbooks
PROFESSIONAL SCIENTIFIC & TECHNICAL	FDI in professional, scientific and technical activities	Provincial Statistical Yearbooks
GDP	Real gross domestic product	China Statistical Yearbooks
AVERAGE WAGE	Average wage	CEIC database
TRADE BALANCE	Total value of all imports minus total value of all exports	China Statistical Yearbooks
CPI	Consumer price index	China Statistical Yearbooks
RECYCLING RATE	Harmless treatment rate of domestic garbage	Ministry of Housing and Urban-Rural Development of China
RESEARCH WORKER	The number of workers who involved in research activities	China Statistical Yearbooks
PASSENGER TRAFFIC	The total movement of passengers using inland transport on a given network	China Ministry of Transport
HOUSE PRICE	The price of commercial property	China Statistical Yearbooks

4.7 Acknowledgement of Data and Methodological Limitations

A full discussion of the limitations of this PhD study will be provided in the conclusion chapter. Nevertheless, it is useful at this stage to point out the two most important limitations of this research that pertain to data and methodological issues.

Starting with data limitations, valid and reliable economic statistics are paramount for researchers and data analysts who seek to investigate the performance of the Chinese economy with respect to many economic indicators. In a recent article, Owyang and Shell (2017) specifically examine the challenges to the Chinese data gathering and reporting process and put China's data quality within the context of other developing nations. They found that:

> "*the Chinese National Bureau of Statistics has improved its source data and its collection practices, making its final official statistics higher quality than those of many counterparts in the developing world.*
>
> *However, due to the country's complex economy and challenges posed by the transition from a command economy to a market economy, China's economic statistics remain unreliable."*
>
> (Owyang and Shell, 2017, p. 8)

Despite the harsh criticism reported above, given that data related to the provinces of China are only available from the Chinese government official statistical databases, it is impossible for the researcher (or, in fact, any researcher) to obtain even better-quality data for China than those used for this study.

The researcher did her utmost to obtain as good and accurate data as possible for this research from the most reliable, official Chinese databases. First, for Hypothesis 1, the researcher scrutinised the aggregate data collected from China's Ministry of Commerce to ensure consistency through data screening for reporting errors and missing values.

Where missing values were found, following standard econometric practice, these were dealt with by simple linear interpolation between data points (see, for example, Pourahmadi, 1989). Second, further checks were made of all data points in the sample (observations) to discard extreme values and 'outliers' (i.e., observations that lie an abnormal distance from other values in the data sample). Finally, for Hypothesis 2 and Hypothesis 3, as a form of data triangulation, the researcher collected PSFDI data directly from the Chinese Provincial Statistical Yearbooks that are compiled at local, Chinese provincial level (rather than by China's Ministry of Commerce).

Another set of limitations relates to the challenges and/or constraints posed by the econometric methods employed, mainly based on the assumptions underpinning such methods, the most important of which refers to assuming that the DGP is linear, this also applies to the cointegrating relationship tested for by the ARDL approach to cointegration used in the present study. That said, it is possible that the true nature of the underlying multivariate relationship between FDI and/or PSFDI and their respective determinants is non-linear in nature. Recent developments in non-linear cointegration techniques now make it possible to test for non-linear cointegration with the NARDL method (Shin *et al*., 2014), which could be profitably employed by future studies wishing to investigate nonlinearities - and more specifically, asymmetries - in the relationship in question.

4.8 Ethical Considerations

This PhD thesis only uses publicly available secondary data collected from reliable national (Chinese) and international databases. Accordingly, no ethical issues related to primary data collection involving research with human participants apply to the analysis carried out in this PhD study. As such, in accordance with Coventry University's regulations, this study is classed as 'low risk'. Nevertheless, the researcher applied for and obtained Full Ethics Approval for this research (please see Appendix for the Ethics Approval Certificate obtained on 18 November 2019; Project Reference

Number: P97357). It is worth emphasising that the data obtained by the researcher do not have any consent, confidentiality, anonymity, copyright or intellectual ownership issues and do not raise any concerns or difficulties in terms of security measures to be employed in data collection, data back-up, data storage, data sharing or in regulating access to data post PhD submission.

The data employed for this PhD study does not entail any 'personal information', as such it falls outside the jurisdiction of the *General Data Protection Regulation* (*GDPR*), the legal framework that sets guidelines for the collection and processing of personal information from individuals who live in the European Union (EU).

The researcher was committed to ensuring reliance on transparent procedures to allow the replicability of the results, and did her utmost to ensure the accuracy of data and results, and the highest levels of honesty and integrity in the review of relevant literature, in the research design and framework, and in conducting the estimations and presenting the research findings in order to ensure that such findings are robust and defensible.

The research activity, including the estimations and hypothesis testing for this PhD study, were carried out within Coventry University's premises which fulfil all requirements of current UK Health and Safety legislation and good practice.

Finally, it should be noted that the researcher self-funded her PhD hence there were no financial considerations that could have posed any conflicts of interest. There were also no potential or actual conflicts of interest arising from personal or institutional factors in relation to the research of this PhD study.

4.9 Chapter Summary

This chapter discussed and justified the econometric framework employed in this study. The chapter began by discussing the epistemological and ontological positioning of the present research in the context of the scientific methodology of econometrics. Next, it introduced the general concepts of econometrics and regression analysis, to then go on to distinguish between time series and panel data models, both of which are used to test the three hypotheses constituting the analytical framework to be subjected to empirical scrutiny in this research. The advantages of these econometric techniques were explained in detail. The concept of stationary time series was discussed along with an illustration of the unit root tests that are used in the empirical analysis later in this PhD thesis. The concept of cointegration was then examined in detail with special attention being paid to a description and justification of the Auto Regressive Distributed Lag (ARDL) bounds testing approach to cointegration that is adopted for testing Hypothesis 1, including its advantages and disadvantages compared to other cointegration methods. This section also discussed the diagnostic tests employed to reassure as to the satisfaction of critical classical regression model assumptions and the reliability and robustness of the results to be obtained. Next, the chapter discussed the provincial-level panel data econometric approach that is also used later in the empirical analysis to test Hypotheses 2 and 3. Regarding the panel data estimation, we employ a forward-looking method called 'Regression with Driscoll-Kraay standard errors (xtscc) programme', which is a new Stata programme with plenty of improvements compared to the previous "xtreg" Stata command programme, which is more suitable for our data. Finally, the chapter offered a detailed description of both the time series and panel data obtained for estimation, some important data and methodological limitations, and the ethical issues considered by the researcher to ensure that the original findings reported in this thesis are valid, reliable, robust and defensible.

Chapter Five: Empirical results and discussion

5.1 Chapter Overview

This chapter presents and discusses the results of a quantitative analysis of the determinants of Foreign Direct Investment (FDI) and Producer Services FDI (PSFDI) in China, testing each of the three hypotheses identified in the framework developed earlier in the thesis. The chapter is structured sequentially, following a logical order according to each of the three hypotheses tested. First, in section 5.2, appropriate time series econometric (cointegration) techniques are used to test the difference, if any, in the factors affecting aggregate FDI and PSFDI, which forms the basis of ***Hypothesis 1***. In the following section (section 5.3), the determinants of aggregate FDI and PSFDI are investigated using provincial level panel data on an extended model specification (***Hypothesis 2***). Finally, based on the provincial-level panel data econometric analysis, the factors affecting PSFDI in the sub-sectors of the producer services industry are investigated (***Hypothesis 3***), with the respective results presented in section 5.4. A further discussion of the findings (section 5.5) and some concluding remarks (section 5.6) end the chapter.

5.2 Time Series Econometric Analysis Comparing Differences, if any, in the Determinants of Aggregate FDI and Producer Services FDI (PSFDI)

In this section, we compare the differences in the influencing factors between aggregate FDI and PSFDI, which is the first hypothesis of the theoretical framework of this PhD study.

5.2.1 Data description

The quarterly time series data used to test ***Hypothesis 1*** were obtained from different data sources. Both FDI and PSFDI data come from the Ministry of Commerce of China. The data for real GDP growth rate are collected from the CEIC China Economic

database, and the data on urban labour market demand (number of skilled professional workers) are obtained from the Ministry of Human Resources and Social Security of China. The data for the wage variable comes from the National Bureau of Statistics of China. Data on total trade volume as a percentage of GDP, representing trade openness, are collected from the OECD. The exchange rate of the CNY against the US dollar comes from the IMF. Data on the consumer price index (CPI) are collected from the National Bureau of Statistics of China. The data used to represent the business status of manufacturing companies comes from the National Bureau of Statistics of China. The data on highway freight traffic comes from the Ministry of Transport of China. Data on the numbers of dial-up internet users come from the Chinese Ministry of Industry and Information Technology. In this first hypothesis, quarterly data ranging from 2003 to 2018 are used to explore the difference in location determinants between aggregate FDI and PSFDI. Table 5.1 presents details of the definition of each variable (measure) and the source from which the data were obtained.

5.2.2 Variables description

The variables used to test the three hypotheses in this thesis are based on a review of both the theoretical and applied literature on FDI and PSFDI. By reviewing previous literature, it was posited that the macroeconomic factors influencing aggregate FDI and PSFDI may be different.

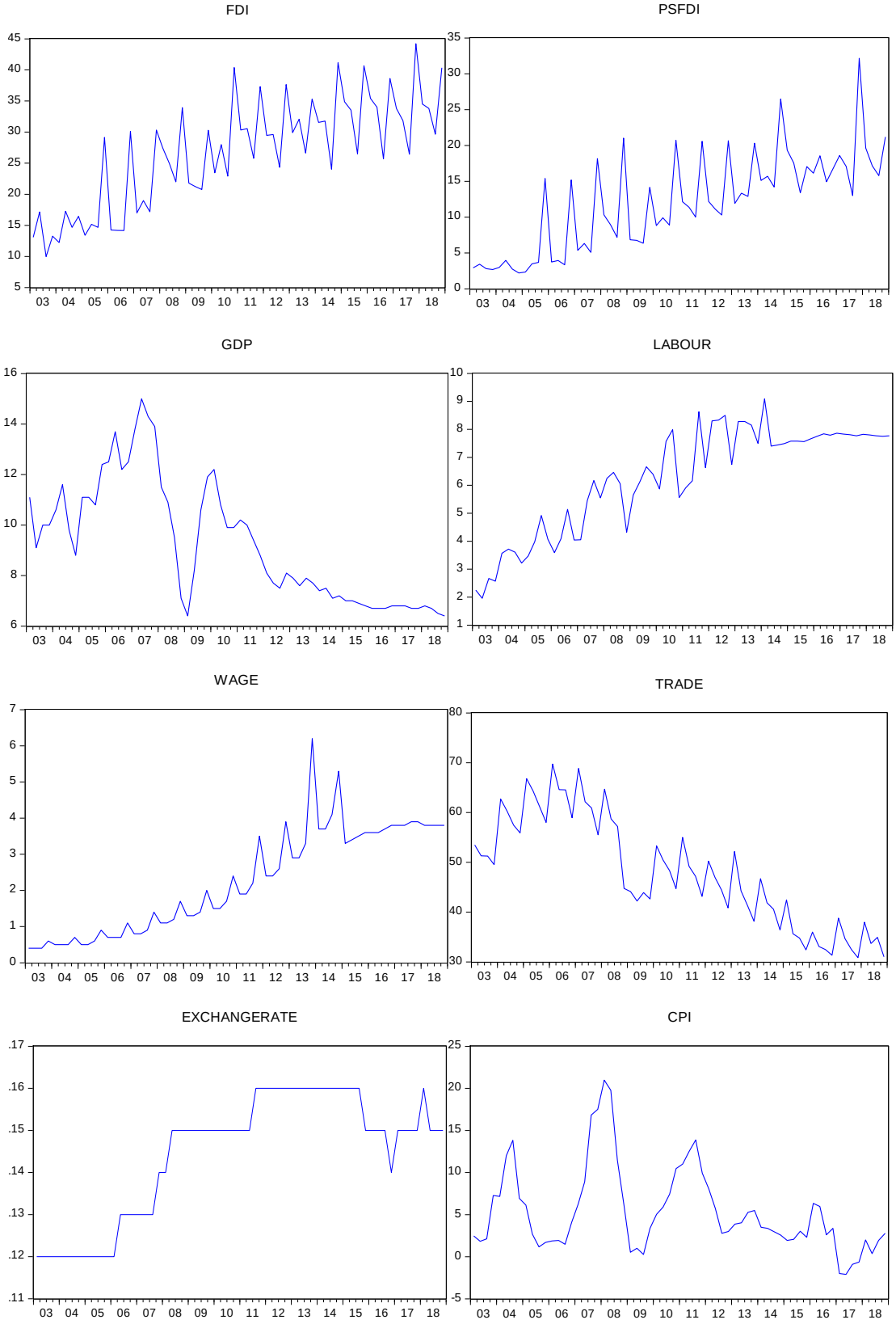
Table 5.1: Variable Definition and Data Sources

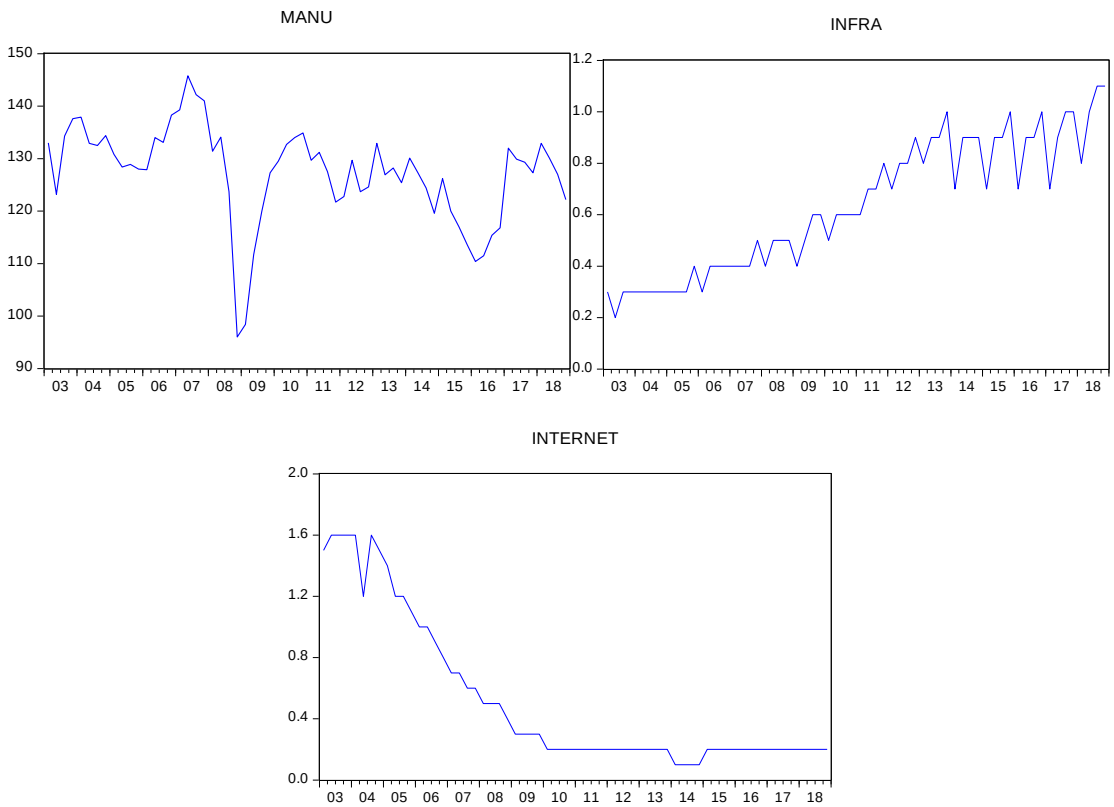
Variable	Definition	Data Source
FDI	Aggregate foreign direct investment	Ministry of Commerce of China
PSFDI	Producer services foreign direct investment	Ministry of Commerce of China
GDP	The growth rate of real gross domestic product	CEIC China Economic Database
LABOUR	Urban labour demand: skilled professional worker	Ministry of Human Resources and Social Security of China
WAGE	Employee income	National Bureau of Statistics of China
TRADE	Imports (FOB) plus Exports (CIF) as a % of GDP	Organisation for Economic Co-operation and Development
EXCHANGERATE	Exchange rate (CNY against USD)	International Monetary Fund
CPI	Consumer price index: Quarter on Quarter (QOQ)	National Bureau of Statistics of China
MANU	Business Climate Index (BCI) for Manufacturing industry	National Bureau of Statistics of China
INFRA	Highway: cargo traffic	Ministry of Transport of China
INTERNET	Number of Internet users: dial-up internet access	Ministry of Industry and Information Technology

Source: the above table is elaborated by the author

5.2.3 Visualisation of the plots of each variable over the sample period

Figure 5.1: Plots of individual time series





To start with, to get a 'good feel' for the data, the quarterly series of the individual variables are plotted over the sample period to investigate their individual trends and time-series properties.

The first chart (top left) of Fig. 5.1, plots the quarterly data of China's inward FDI from 2003 to 2018. It is clear that inward FDI has experienced an overall growth trend. From 2003 to the second quarter of 2005, China's FDI did not increase significantly. However, in the third quarter of 2005, a significant increase occurred, to then fall back in the fourth quarter. In 2006 and 2007, a similar pattern emerged. In the following years, China's FDI showed a trend of steady growth year by year. The quarterly ups and downs can be attributed purely to seasonal effects, despite a general upward trend.

The second chart (top right) of Fig. 5.1, plots the quarterly series for China's PSFDI, which did not increase from the end of 2003 to 2005. Nevertheless, in the fourth quarter of 2005, rapid growth broke the previous stability. However, this breakthrough did not

last long, reverting back to previous levels in the first quarter of 2006. From 2006 to 2008, China's PSFDI maintained steady growth, but the growth rate was relatively slow. After the second quarter of 2008, the value of PSFDI dropped sharply, remaining at a low level until the third quarter of 2009. Starting in the fourth quarter of 2009, PSFDI showed an improvement. In the second quarter of 2014, a further noticeable increase took place. Three consecutive years of decline followed. After a further decline in the third quarter of 2017, PSFDI experienced a significant increase.

The third line-chart of Fig. 5.1 shows the quarterly growth rate of China's GDP. From 2003 to the fourth quarter of 2004, the growth rate of GDP increased first and then decreased. After 2005, the growth rate of GDP increased rapidly, reaching a peak in 2006. However, in the second quarter of 2007, a particularly noticeable decrease broke the previous growth trend. This decrease endured until the beginning of 2009, indicating that the financial crisis had a significant negative impact on GDP. After 2009, following a considerable increase in the GDP growth rate, it began to decrease again in the second quarter of 2010. Since then, and up to 2018, it continued to decline albeit marginally.

The fourth chart of Fig. 5.1 shows the demand for Chinese urban labour force (LABOUR: for technicians) from 2003 to 2018. This value maintained a rapid growth trend from 2003 to the first quarter of 2008. A noticeable decrease occurred in the second quarter of 2008, indicating that the global financial crisis had an impact on the local labour market, prompting enterprises to reduce the demand for skilled labour. After the third quarter of 2008, corporate demand for skilled labour rose year by year despite quarterly (seasonal) fluctuations, and it maintained a moderate growth level after 2014.

The fifth chart of Fig. 5.1 shows the employee income (WAGE) in China. Despite some minor fluctuations, employee income grew gradually in China from 2003 to the second quarter of 2011, and was not affected by the 2007/2008 global financial crisis. Yet, a

significant decline occurred in the third quarter of 2013. Since then, the average wage level grew continuously in the following two quarters and then, declined significantly in the third quarter of 2014, maintaining a fairly constant level after the first quarter of 2016.

The sixth chart plots China's exchange rate level (EXCHANGERATE: CNY against USD) from 2003 to 2018. The CNY appreciated in recent years. From 2003 to 2005, the CNY-USD exchange rate maintained a stable level, and it snowballed year by year from 2006 to 2008. From 2008 to 2011, the CNY exchange rate remained unchanged. After the third quarter of 2011, after a slight increase, the exchange rate of CNY maintained a relatively constant level. It began to decrease year by year from the fourth quarter of 2014 until it steadily climbed after the second quarter of 2016.

The seventh chart of Fig. 5.1 shows China's imports and exports volume as a percentage of GDP (TRADE) from 2003 to 2018, reflecting China's level of openness over the past 15 years. From 2003 to the second quarter of 2008, the value of the trade balance increased year by year, with some small fluctuations. At the beginning of the third quarter of 2008, this value continued to decrease for three consecutive years. After hovering from 2012 to 2013, the most significant increase occurred in the second quarter of 2014. This level of growth further climbed in the second quarter of 2015, ushering in the highest trade balance in nearly 15 years. In the following three years, China's trade balance first decreased, then rose, and then went back and forth.

The eighth chart of Fig. 5.1 shows the trend of China's consumer price index (CPI) from 2003 to 2018. The value of China’s CPI shows considerable volatility, increasing first (from 2003 to 2005, from 2006 to 2008, and from 2009 to 2012) and then decreasing, forming many peaks. After the second quarter of 2012, China's CPI index maintained a stable level for nearly three years and then began to decrease in 2016. Since then, it increased year by year.

The ninth chart plots the business climate index (BCI) of China's manufacturing industry (MANU), a measure constructed from the business development status of such companies. From 2003 to the third quarter of 2007, the value of the manufacturing industry BCI increased overall, with some small temporary fluctuations. The most significant decline occurred in the second quarter of 2008, which prompted the manufacturing industry BCI to reach its second peak and valley in the third quarter of 2010. It is evident that the impact of the global financial crisis on Chinese enterprises cannot be ignored; it seriously affected the companies' operating capabilities. Since 2009, after the 2007/08 financial crisis, corporate profitability started to recover, increasing for two consecutive years. After 2011, the manufacturing industry BCI re-started to decrease, and this decline remained until the first quarter of 2016. A dramatic increase occurred between the second quarter of 2016 and the first quarter of 2017, after which the value continued to fluctuate, and then decrease by the fourth quarter of 2017.

The tenth line-chart of Fig. 5.1 shows the volume of highway cargo traffic (INFRASTRUCTURE) of China's expressways from 2003 to 2018. This variable represents China's infrastructure level, especially freight capacity and logistics development. From 2003 to 2009, China's freight transhipment capacity steadily increased, with some small fluctuations. Subsequently, from 2010 to 2013, the growth of freight capacity continued to accelerate and reached the second peak in the second quarter of 2013. In the third quarter of 2013, China's freight capacity continued to hover between growth and decline and then grew again from 2018 onwards, reaching its most significant peak.

The eleventh chart of Fig. 5.1 presents the number of China's internet users for dial-up internet access (INTERNET) between 2003 and 2018. Overall, the number of dial-up users in China decreased year by year and then peaked in the first quarter of 2004. There was a significant slump in the second quarter of 2004, followed by a recovery by the end of the same year. Since then, the number of internet users steadily declined,

reaching its lowest point in 2014, and then maintaining a stable level after a slight rebound in the next three years.

5.2.4 Model specification

Hypothesis 1: The determinants of FDI inflows in the producer services sector are different from the general determinants of FDI inflows.

To test ***Hypothesis 1***, we generate two equations, Eq. 5.1 and Eq. 5.2:

$$FDI_t = a_0 + a_1 GDP_t + a_2 LABOUR_t + a_3 WAGE_t + a_4 TRADE_t + a_5 EXCHANGERATE_t + a_6 CPI_t + a_7 MANU_t + a_8 INFRA_t + a_9 INTERNET_t + \varepsilon_t \quad \ldots\ldots\ldots (5.1)$$

$$PSFDI_t = \beta_0 + \beta_1 GDP_t + \beta_2 LABOUR_t + \beta_3 WAGE_t + \beta_4 TRADE_t + \beta_5 EXCHANGERATE_t + \beta_6 CPI_t + \beta_7 MANU_t + \beta_8 INFRA_t + \beta_9 INTERNET_t + u_t \quad \ldots\ldots\ldots (5.2)$$

In the above equations, Eq. 5.1 and 5.2, the explanatory variables are the same but the dependent variables are different, FDI in Eq. 5.1 and $PSFDI$ in Eq. 5.2. The coefficients a_0 and β_0 are the respective intercepts, u_t and ε_t express the error term in the respective equations, and a_1 to a_9, β_1 to β_9 are the regression coefficients of each explanatory variable.

5.2.5 Unit root test results

In order to estimate and test for the different impacts of macroeconomic variables on aggregate FDI and PSFDI, the autoregressive distributed lag (ARDL) cointegration methodology is used (for a recent discussion of the advantages of this method, see Dobre and Davidescu, 2013). As originally noted by De Vita and Abbott (2004), the

method is ideal when there is uncertainty about the order of integration of explanatory variables, but it is still imperative to ascertain that none of the variables is integrated of order two, i.e. *I(2)*, or higher. In what follows, therefore, the Augmented Dicky-Fuller (ADF) unit root test, and the Narayan and Popp (2010) unit root test with two structural breaks, are employed to test for the order of integration of each variable.

Nevertheless, before using the formal unit root tests highlighted above, following good practice, it is useful to begin by getting 'a feel' for the 'temporal properties' of each time series in levels (as opposed to 'in first difference') by simply looking at their plotted values over time, as shown by each line-chart in Fig. 5.1. For most of the line-charts, with perhaps the sole exception of the CPI variable, we can see an evident trend, upwards for some series and downwards for others, suggesting the presence of a unit root, i.e., that each variable - except possibly the CPI series - is integrated of order one (or first-difference stationary).

Tables 5.2 and 5.3 present the results of the formal ADF test (with a constant term included) and the Narayan and Popp (2010) unit root tests with two structural breaks (in level and slope). The latter accounts for possible time breaks in the series. From the results of the ADF test presented in Table 5.2, the variables used in this study appear to be all integrated of order one, i.e., *I(1)* in levels, and hence first-difference stationary.

However, as discussed in the methodology chapter, the ADF test does not account for possible structural breaks. It is, therefore, safer to conduct an additional unit root test capable of accounting for any potential breaks in the series, so as to corroborate the results of the ADF test.

As can be seen from the results of the Narayan and Popp (2010) unit root test reported in Table 5.3, all the time series representations of the variables in levels are confirmed to contain a unit root and first-difference stationary.

Based on the results of the two different unit root models/methods, therefore, we can conclude that all the variables are integrated of order one in levels, and hence, the ARDL bounds testing approach to cointegration can be safely applied to the model in question.

Table 5.2: Augmented Dickey-Fuller unit root tests

Augmented Dickey-Fuller statistics (constant only)			
Variable	t-Statistic	P-value	Inference
FDI	-1.6499 (1)	0.4512	Non-stationary
PSFDI	-1.2286 (1)	0.6566	Non-stationary
GDP	-1.7326 (1)	0.4101	Non-stationary
LABOR	-2.6354 (1)	0.0916	Non-stationary
WAGE	-0.8842 (1)	0.7866	Non-stationary
TRADE	-0.6923 (1)	0.8403	Non-stationary
EXCHANGE RATE	-1.6429 (1)	0.4550	Non-stationary
CPI	-1.3670(1)	0.5918	Non-stationary
MANU	-2.8574 (1)	0.0562	Non-stationary
INFRA	-0.2696 (1)	0.9226	Non-stationary
INTERNET	-2.0221 (1)	0.2769	Non-stationary
ΔFDI	-4.5161***(0)	0.0006	Stationary
ΔPSFDI	-15.3294*** (0)	0.0000	Stationary
ΔGDP	-6.6850***(0)	0.0000	Stationary
ΔLABOR	-9.3524***(0)	0.0000	Stationary
ΔWAGE	-4.0284**(0)	0.0025	Stationary
ΔTRADE	3.8141**(0)	0.0047	Stationary
ΔEXCHANGE RATE	-9.9179*** (0)	0.0000	Stationary
ΔCPI	-5.5382***(0)	0.0000	Stationary
ΔMANU	-7.2994***(0)	0.0000	Stationary
ΔINFRA	-4.8390***(0)	0.0002	Stationary
ΔINTERNET	-11.1016***(0)	0.0000	Stationary

Note(s): Δ is the first difference. The estimation and ADF unit root tests were conducted using EViews 10.0. ***, ** and * denote the rejection of the null of a unit root at the 1, 5 and 10% significance level, respectively.

Table 5.3: Narayan and Popp (2010) unit root tests with two structural breaks.

Two breaks in level and slope				
Variable	Test statistic	Break dates	φ	k
FDI	-3.0200	2009Q1; 2010Q4	-1.2240	3
PSFDI	-3.4630	2009Q3; 2015Q3	-1.7480	3
GDP	-4.4470	2007Q4; 2008Q3	-0.4332	0
LABOR	-2.7440	2008Q3; 2010Q3	-0.6266	3
WAGE	-3.7940	2011Q3; 2013Q3	-0.8547	5
EXCHANGE RATE	-4.5240	2008Q1; 2015Q3	-0.5781	0
TRADE	-1.5580	2008Q4; 2009Q4	-0.2424	3
MANU	-4.3230	2008Q3; 2009Q4	-0.5842	4
CPI	-5.8690	2007Q2; 2009Q1	-0.5747	3
INFRA	-1.2900	2011Q3; 2013Q4	-0.4418	3
INTERNET	-4.1830	2006Q1; 2014Q4	-0.1761	4
ΔFDI	-21.4900***	2008Q4; 2011Q3	-3.7460	2
ΔPSFDI	-14.9100***	2010Q3; 2015Q3	-3.5560	2
ΔGDP	-6.4800***	2006Q2; 2009Q1	-1.9910	4
ΔWAGE	-7.7680***	2011Q3; 2013Q3	-2.2050	3
ΔLABOR	-10.3700***	2008Q3; 2010Q3	-2.7490	2
ΔEXCHANGE RATE	-4.7780**	2011Q2; 2015Q2	-1.9300	4
ΔTRADE	-19.2500***	2008Q4; 2009Q4	-3.4750	2
ΔMANU	-5.8510***	2008Q3; 2012Q4	-1.3470	4
ΔCPI	-8.0160***	2008Q2; 2011Q3	-1.5580	3
ΔINFRA	-21.6100***	2011Q3; 2013Q4	-3.8780	2
ΔINTERNET	-10.8300***	2013Q4; 2014Q4	-1.6920	2

Note(s): Δ is the first difference operator, φ denotes the autoregressive coefficient and k is the optimal lag order. The 1, 5 and 10% critical values are -5.138, 4.741 and -4.430, respectively. The critical values are from Narayan and Popp (2010). The estimations and tests were conducted using a program code written in GAUSS that was produced by Narayan and Popp (2010). The estimations and tests were conducted using EViews 10.0. *** and ** denote the rejection of the null of a unit root at the 1 and 5% significance level, respectively.

The results of the Narayan and Popp (2010) unit root test reported in Table 5.3 are particularly useful since, in addition to helping us establish with greater confidence the

actual order of integration of each variable, they shed light on the time of the breakpoints pertaining to each individual series, which coincide with the peaks and troughs visible in the various line-charts displayed in Fig. 5.1.

Specifically, Table 5.3 reveals that there are two structural breakpoints in China's aggregate FDI, in the first quarter of 2009 and the fourth quarter of 2010. These two break dates not only match those visible in Fig. 5.1, most importantly, they can be explained by phenomena occurring in China. For example, for the first structural breakpoint, in the first quarter of 2010, just after the fourth quarter of 2009 break date, China's absorption of FDI fell by 20.6% year-on-year.

The two structural breakpoints of GDP growth occur in the fourth quarter of 2007 and the third quarter of 2008. These break dates too seem plausible and justifiable. According to the National Bureau of Statistics, the economic growth rate in 2007 showed a continuous increase in the first and second quarter, and the third quarter began to show a downward trend. Through the implementation of a series of macro-control measures, the government strengthened various policies and measures on land, credit and market access to avoid the drawbacks caused by overheated economic development. Moreover, since China's total import and export volume accounts for nearly a quarter of China's gross national product, especially exports, trade has become a very important factor affecting the growth of China's GDP. Under the influence of the 2008 economic crisis, China's foreign trade exports showed a declining trend, and the competitiveness of export commodities was significantly weakening (Jing, 2012). These trends constitute another reason for the decline in GDP growth in the third quarter of 2008.

The two structural breakpoints for the demand for skilled labour force (LABOUR) were found in the third quarter of 2008 and the third quarter of 2010. With the outbreak of the financial crisis in 2008, China's employment situation reversed, mainly due to the decline in the demand for labour, which triggered a wave of unemployment. In the

third quarter of 2010, the demand for labour force plummeted, and the number of surplus labour force increased sharply and peaked in the same year.

The two structural breakpoints for the wage series (WAGE) occur in the third quarter of 2011 and the third quarter of 2013. The reasons for the first breakpoint are as follows:

(1) In 2011, faced with the complicated and severe domestic and international environment, China's economy maintained steady and rapid development, providing a solid foundation for the wage growth of employees (Fan et al., 2018).

(2) Further reform and improvement of the wage system created conditions for the increase of wages for employees. The "Twelfth Five-Year Plan" (see link: http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/laws/1314.pdf) outlined the efforts that were to be made to increase the proportion of household income in national income distribution and to increase the proportion of labour compensation in primary distribution. Accordingly, a total of 24 provinces across the country adjusted their minimum wages, with an average increase of 22%. Twenty-seven provinces implemented the 2011 wage guideline, with a baseline increase of more than 14%.

(3) In 2011, the national personal income tax realised income was 605.409 billion CNY, a year-on-year increase of 25.2%. Although affected by the implementation of personal income tax reform on September 1st 2011, the wage and salary income tax in the fourth quarter decreased by 11.1% year-on-year. However, the annual salary and salary income tax still achieved a high growth rate of 23.6%, mainly due to the rapid growth of wage income (Jia, 2014). In 2013, China's economy maintained steady and rapid growth, laying the foundation for a steady increase in wages. At the same time, according to the report of the State Council of China, a

series of national policy measures have also promoted the steady growth of wages, including a rise in minimum wages in 27 provinces across the country, with an average increase of 17%; 20 provinces have set a guideline for wage growth, with a baseline of around 14%. However, although the national average wage level continued to maintain rapid growth, the growth rate slowed down. In 2013, the actual annual growth rate of the average annual wages of urban non-private units and urban private units was 1.7 and 3.1 percentage points lower than the previous year (http://www.gov.cn/xinwen/2014-05/27/content_2688237.htm).

The two structural breakpoints of the exchange rate (EXCHANGERATE: CNY against US dollars) are in the first quarter of 2008 and the third quarter of 2015. The first structural break date can be explained by the continuous appreciation of the CNY following the implementation of the floating exchange rate system on July 21st 2005, which marked the central parity of the CNY against the US dollar. In 2008 the CNY continued to appreciate strongly; one unit of CNY could exchange for 0.142/0.147 unit of US dollar. The second structural break could be explained by the fact that China's economic growth rate slowed down in 2015, and the growth rate fell below 7% for the first time in 25 years. Additionally, according to the People's Bank of China, China's foreign exchange reserves decreased significantly in 2015 (by 512.7 billion US dollars), shrinking for the first time since 1992.

Two structural breakpoints related to the variable 'TRADE' appear to have taken place in the fourth quarter of 2008 and the fourth quarter of 2009. According to the statistical report of the Ministry of Finance of China, the reasons can be summarised as:

(1) Suffering from the 2008 global financial crisis, China's imports and exports were particularly hard-hit and decreased sharply.

(2) With regard to the fourth quarter of 2009, there was a dramatic increase, indicating that China's economic situation improved after the 2008 financial crisis and achieved a higher foreign trade volume.

The two structural breakpoints for the manufacturing industry business climate index (MANU) occurred in the third quarter of 2008 and the fourth quarter of 2009. In 2008, the US subprime mortgage crisis turned into a global financial crisis, and the foreign trade of China's manufacturing industry saw a cliff-like decline, falling by around 20 percentage points. With the implementation of a series of stimulating economic policies, China's manufacturing industry recovered in 2009. In particular, China's manufacturing industry accounted for 15.6% of the global manufacturing value in 2009, becoming the world 's second-largest industrial manufacturing country after the United States.

There are two structural breaks for China's CPI, in the second quarter of 2007 and the first quarter of 2009. In 2007, the CPI in China rose by 4.8% over the previous year. Since 2009, China's CPI has been rising overall, reaching around 5.5% in October 2011, higher than the average inflation rate of 4.25% from 1994 to 2010.

The two structural breakpoints for highway freight traffic (INFRASTRUCTURE) series appear to take place in the third quarter of 2011 and the fourth quarter of 2013. Regarding the first breakpoint, by the end of 2011, the total mileage of highways in China had grown to 4.1064 million kilometres, an increase of 98,200 kilometres over the end of the previous year, which significantly improved the transportation capacity of highways. The second structural breakpoint can be explained by the downturn of China's macroeconomy in 2013, and the rapid development of the railway that squeezed the expressway market, slowing down the growth rate of expressways.

The two structural breakpoints for the dial-up users (INTERNET) in China occurred in the first quarter of 2006 and the fourth quarter of 2014. According to the monthly operation report of China's telecommunications industry (see official document available at: http://www.china.com.cn/chinese/EC-c/1243565.htm), the number of broadband users in China expanded rapidly in 2006 while the number of dial-up internet users decreased sharply. With regard to the second structural breakpoint, although the

number of dial-up internet users rose slightly at the end of 2014, broadband internet access and use remained mainstream, with a large market share.

5.2.6 ARDL cointegration results

As shown in Table 5.2 and Table 5.3, the results of the ADF unit root test and Narayan and Popp (2010) unit root test with two structural breaks, indicate that all variables are integrated of first order. Hence, it is appropriate to use the Autoregressive Distributed Lag (ARDL) cointegration model (Pesaran and Shin, 1999; and Pesaran, Shin, and Smith, 2001) to test and estimate the long- and short-run relationships between the independent and dependent variables.

Hypothesis 1 stated that the determinants of China's aggregate FDI and PSFDI may be different. First of all, from the perspective of industry division, producer services in China currently account for a high proportion in the tertiary industry. As elaborated earlier in this PhD thesis, unlike ordinary services, the main features of producer services are that they are specialised, technological and high value-added services. Furthermore, producer services may have higher requirements on the quality of labour and the economic environment of investment targets, and these standards may be higher than for aggregate FDI. Of course, some macro variables may affect both aggregate FDI and PSFDI. But in the two regression models, the influence of independent variables on the two dependent variables may at least vary in degree. It is, therefore, opportune to formally test for any such differences.

Table 5.4: ARDL Long Run Form and Bounds Test

F-Bounds Test					F-Bounds Test				
Dependent Variable	F-statistic	Critical Value Bounds	I (0)	I (1)	Dependent Variable	F-statistic	Critical Value Bounds	I (0)	I (1)
FDI	7.6382***	10%	1.63	2.75	PSFDI	16.5858***	10%	1.63	2.75
		5%	1.86	3.05			5%	1.86	3.05
		2.5%	2.08	3.33			2.5%	2.08	3.33
		1%	2.37	3.68			1%	2.37	3.68
t-Bounds Test					t-Bounds Test				
Dependent Variable	T-statistic	Critical Value Bounds	I (0)	I (1)	Dependent Variable	F-statistic	Critical Value Bounds	I (0)	I (1)
FDI	-5.9508***	10%	-1.62	-4.26	PSFDI	-7.9989***	10%	-1.62	-4.26
		5%	-1.95	-4.61			5%	-1.95	-4.61
		2.5	-2.24	-4.89			2.5	-2.24	-4.89
		1%	-2.58	-5.25			1%	-2.58	-5.25

Table 5.5: Error correction and cointegration models (FDI and PSFDI)

Panel A: Long-run coefficients (levels regression)					
Variable	Coefficient	p-value	Variable	Coefficient	p-value
GDP	-0.0816	0.8679	GDP	0.9697**	0.0304
LABOR	1.3721	0.1198	LABOR	1.5909*	0.0759
WAGE	-1.1088	0.1941	WAGE	1.9117**	0.0254
TRADE	-0.1199	0.3357	TRADE	-0.3528***	0.0037
EXCHANGE RATE	-0.3989	0.4925	EXCHANGE RATE	-0.0629	0.8792
CPI	-0.0520	0.6378	CPI	-0.3186***	0.0080
MANU	0.1879**	0.0336	MANU	0.1745**	0.0179
INFRA	9.1422	0.3134	INFRA	-11.2869	0.0971
INTERNET	-8.7661***	0.0028	INTERNET	-2.6231	0.2464
Panel B: Short-run coefficients (ARDL error correction regression)					
Variable	Coefficient	p-value	Variable	Coefficient	p-value
D(FDI(-1))	0.1494	0.1344	D(LABOR)	0.2980	0.4735
D(GDP)	1.2575***	0.0033	D(WAGE)	0.5366	0.3379
D(TRADE)	0.2556**	0.0316	D(TRADE)	0.0035	0.9797
D(MANU)	-0.2439***	0.0004	D(EXCHANGE RATE)	2.4282***	0.0039
D(MANU(-1))	-0.2548***	0.0002	D(MANU)	-0.2601***	0.0000
D(INFRA)	-16.6753***	0.0019	D(MANU(-1))	-0.2924***	0.0000

D(INFRA(-1))	-16.4369***	0.0013	D(INTERNET)	6.3710*	0.0778
D(INTERNET)	4.9839	0.1962	@QUARTER=1	-8.7359***	0.0000
@QUARTER=2	10.0763***	0.0000	@QUARTER=2	-3.9052***	0.0001
@QUARTER=3	4.0314***	0.0008	@QUARTER=3	-8.1755***	0.0000
@QUARTER=4	17.7136***	0.0000	ECT	-0.9914***	0.0000
ECT	-0.9092***	0.0000			
Diagnostics					
SC	0.3617 [0.6988]		SC	1.0629 [0.3550]	
HETER	1.2876 [0.2403]		HETER	1.3099 [0.2272]	
Normality Test	1.2491 [0.5355]		Normality Test	1.3545 [0.5080]	
R-squared	0.9433		R-squared	0.9117	
Durbin-Watson statistic	2.0131		Durbin-Watson	2.0251	

Note(s): Probabilities values are presented in parenthesis.***, ** and * denote the rejection of the null hypothesis of a unit root at the 1%, 5% and 10% significance level, respectively. The optimal lag structure is selected by AIC, starting with max 5 lags. SC denotes the Breusch and Godfrey serial correlation test, HETER denotes the Breusch and Pagan heteroscedasticity test, and NORM denotes the Jarque–Bera test for normality.

Figure 5.2: Cumulative sum (CUSUM) and Cumulative sum of squares (CUSUMQ) test for aggregate FDI

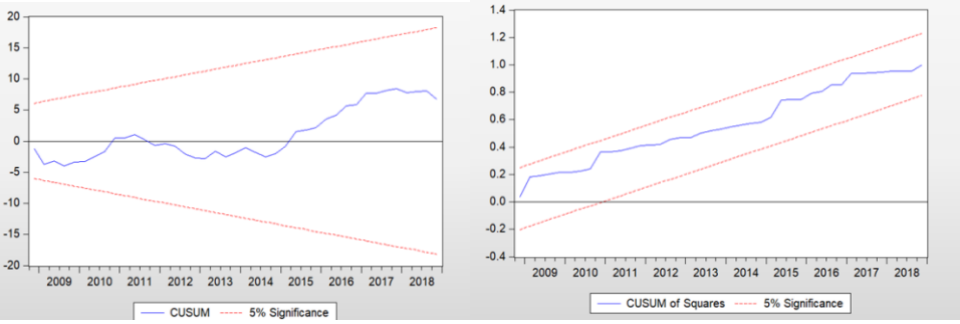


Figure 5.3: Cumulative sum (CUSUM) and Cumulative sum of squares (CUSUMQ) test for PSFDI

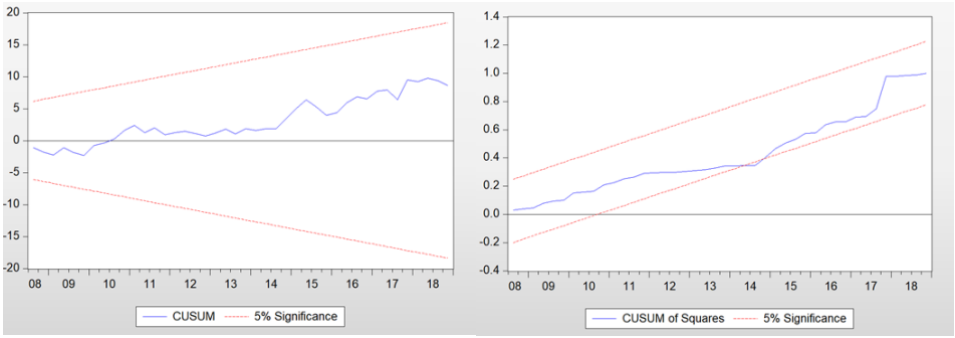


Table 5.4 and 5.5 show the results for ***Hypothesis 1***, testing whether the factors that affect FDI and PSFDI may be different. We can see that the manufacturing industry BCI (MANU: reflecting business climate and profitability) has a positive effect on both aggregate FDI and PSFDI in the long-run, with an estimated coefficient of 0.1879 and 0.1745, respectively, both showing statistical significance at 5% (with P-values of 0.0336 and 0.0179, respectively). The business environment has an essential impact on FDI, and previous researchers often used physical and administrative infrastructure to represent the business environment of the host country. For example, Shah and Afridi (2016) found that poor governance and government corruption have a significant negative impact on attracting FDI. Our results imply that the further the development of the manufacturing industry, the higher the inflow of both FDI and PSFDI, which is also in line with our expectations. The business climate index of the manufacturing

industry (MANU) that we use in our estimations is collected from the National Bureau of Statistics of China that represents the profitability of manufacturing companies.

Our results show that, in the two models, the coefficients of the exchange rate (EXCHANGERATE: CNY against US dollars), the demand for skilled worker (LABOUR) and the volume of highway cargos (INFRASTRUCTURE) are not statistically significant, indicating that these three variables have no significant effect on China's attraction of both FDI and PSFDI. Although these results are contrary to *a priori* expectations, several previous econometric studies have obtained similar results in the context of China with respect to aggregate FDI. While various studies highlighted the importance of transport infrastructure for FDI inflows, there are still some scholars who obtained different results that are akin to ours. For instance, Quazi (2005) states that there is no correlation between transport infrastructure and inward FDI. Tomlin (2000) points out that there is no meaningful relationship between the exchange rate and FDI inflows, which is also consistent with our results.

The results also suggest that aggregate FDI has a long-term negative relationship with the number of dial-up internet access users (INTERNET), with a coefficient of -8.7661 and a P-value of 0.0028, thereby showing statistical significance at 1%. The number of dial-up subscribers plummeted in the mid-2000s in China, but since then the decline has been slow. The decline in the number of dial-up subscribers means the rise in the number of broadband subscribers, reflecting the rapid growth of the internet in the country. Our finding is consistent with that obtained by Choi (2003) who, using data from 67 countries, finds that FDI increased due to the development of the internet. Our estimated model shows that a decrease in dial-up internet users induce an increase in FDI inflows, and the coefficient is statistically significant.

Our results show that there is a long-run positive correlation between the growth rate of GDP and PSFDI, with an estimated coefficient of 0.9697 and a P-value of 0.0304. Similarly, it is noted by De Gregorio (1992) that there is a significantly positive effect

of GDP growth rate on FDI in the 12 Latin American countries investigated between 1950 and 1985. By examining the relationship between FDI and economic growth across 11 countries, a casual relationship was found by Zhang (2001) in only five countries. In contrast, Magnus and Fosu (2008) conclude that FDI has a long-term positive impact on GDP, but has no significant impact on the economic growth by taking Ghana as an example between 1970 and 2002.

An interesting result we obtain is a long-run positive relationship between wages and PSFDI, with a coefficient of 1.9117, statistically significant at the 5% level (specifically, the P-value is 0.0254). Although this finding is opposite to our *a priori* expectations, it is also supported by many previous researchers. Theortically, Dunning (1993) concluded that multinational firms with the aim of efficiency-seeking investment often require experienced labour, which usually has higher wages. According to the empirical results obtained by Morre (1993) for Germany, and Love and Lage - Hidalgo (2000) for America, higher wages do not always prevent FDI in all industries, and hence there could be a positive correlation between labour costs and FDI. Similarly, Zhao and Zhu (2000) and Cheng (2006), state that there is a positive and statistically significant relationship between the average wage and FDI in China. De Simone and Marcella (2017) for Hungary contend that the coefficient of wage is positive, which means foreign companies are more likely to invest in advanced technology areas that require more skilled and educated workers. Nevertheless, many researchers also believe that foreign enterprises tend to invest in areas with low labour costs (Coughlin and Segev, 2000; Wakasugi, 2005).

A negative relationship is found between the total trade volume as a percentage of GDP (TRADE) and PSFDI, with an estimated coefficient of -0.3528 and a P-value of 0.0037 (hence statistically significant at 1%). Regarding the impact of trade openness on FDI inflows, proponents of trade openness argue that the degree of openness is a major driver of FDI (see, e.g., Cantah et al., 2018; Tybout, 1992). There are various researchers who used trade volume to reveal the degree of openness in one country and

investigate its impact on FDI (Asiedu, 2002; Dupasquier and Osakwe, 2006; and Anyanwu, 2011). Interestingly, we find that total trade volume as a percentage of GDP has a negative effect on PSFDI, which is contrary to our *a priori* expectations but it is a result that also aligns to some scholars' findings. Moreover, Brainard (1997) argues that the impact of trade openness on FDI inflows will vary depending on investors' motivation. For instance, higher trade liberalisation attracts more export-oriented FDI inflows, while trade restrictions stimulate and induce tariff-jumping FDI (Kosteletou and Liargovas, 2000). Using data from Japanese companies in the electronics sector, Belderbos (2003) demonstrates that the EU's anti-dumping actions pose a serious threat to exports and tend to induce FDI in tariff-jumping and, therefore, a low level of trade openness is associated with increasing FDI inflows, which is consistent with our finding. With the aim of expanding the overseas market, investors would prefer to obtain better profits through exports rather than FDI under the economic conditions of a high degree of openness, less restrictions and low trade costs (Seim, 2009). Hence, this result implies that a high level of trade openness may lead to a lower level of FDI inflows. From the perspective of trade protection, it induces the substitution effect between exports and FDI in favour of the low level of degree of openness which leads to higher FDI inflows, due to the fact that high trade barriers are associated with an increase in trade costs, especially for some small recipient countries.

We found that the Consumer Price Index (CPI) has a significantly negative impact on PSFDI, with an estimated coefficient of -0.3186 and a P-value of 0.0080. According to Fischer and Modigliani (1978), a lower inflation rate offers a favourable business climate for foreign investors, conducive to improving shareholder value. Makki and Somwaru (2004) suggest that, for developing countries, a lower inflation rate can effectively attract more FDI inflows and promote the host countries' economic growth, which also aligns to our finding.

The ECM results are shown in Table 5.5. The short-run coefficients indicate that the business climate index (BCI) for the manufacturing industry has a negative impact on

both aggregate FDI and PSFDI in the short-run. The exchange rate (CNY against US dollars) has a strong positive effect on FDI in producer services, at the 1% significance level. On the other hand, GDP growth rate and total trade volume as a percentage of GDP, have a significantly positive effect on inward FDI. However, the volume of highway cargo transportation was found to have the opposite effect.

The error correction terms (ECT) of the aggregate FDI and PSFDI models are -0.9092 and -0.9914, respectively, and are statistically significant. The results imply that the speed of adjustment is fast; it only would take approximately one quarter of a year for almost full adjustment from short-run disequilibrium to long-run equilibrium to take place.

In terms of diagnostic checks, the F-bounds and t-bounds test results of these two models (see Table 5.4) display statistical significance. There is no serial correlation (see the Breusch and Godfrey test and Durbin-Watson test results) in the two models, indicating that each variable is independent. The R-square values of the two models are 0.9433 and 0.9117, respectively, indicating the 'goodness of fit' of the models in explaining the variation in the dependent variable. There is also no heteroscedasticity in the models, meaning that the variability of the random disturbance is consistent (not significantly different) across elements of the estimated vector. In addition, the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares recursive residuals (CUSUMSQ) test graphs - see Figure 5.2 and Figure 5.3 - whose function measures the stability of the models (as discussed in the methodology chapter), show that all the parameters are stable. The findings of both tests for both models are consistent, with both of the respective plots of CUSUM and CUSUMSQ staying well within the 5% critical bounds. Thus, both models pass all the standard diagnostic checks, offering reassurance as to the reliability of the results discussed above.

5.3 Econometric Analysis of Comparing the Differences, if any, in the Determinants of Producer Services FDI (PSFDI) and Aggregate FDI Using Provincial Level Panel Data

In this section, we further investigate the differences in influencing factors between aggregate FDI and PSFDI using provincial level data (Hypothesis 2 of the theoretical framework of this PhD thesis) which, as discussed earlier, may offer even more valuable and reliable evidence from which to gain insights of the determinants of producer services FDI in China.

5.3.1 Data description

The analysis is conducted using provincial level data with a sample period from 1997 to 2017. The data employed to test ***Hypothesis 2*** (and ***Hypothesis 3***) are obtained from various databases. For the independent variables, the data of aggregate FDI for each province is collected from the Chinese Ministry of Commerce. The sub-sector PSFDI data are obtained from the Provincial Statistical Yearbooks available for 26 provinces, and we do the sum to gain the aggregate PSFDI data. This permutation allows us to extend our model specification by including additional variables thanks to the enhanced provincial level data availability. The data for the real GDP, trade balance (total value of all imports minus total value of all exports), CPI index, commercial property prices, the number of researchers, are collected from China's Statistical Yearbooks. The data for average wages is from the CEIC database. The harmless treatment rate of domestic garbage comes from the Ministry of Housing and Urban-Rural Development of China. The number of total movement of passengers using inland transport on a given network is obtained from China's Ministry of Transport. According to the Statistical Classification of Productive Services Industry (2019) issued by the National Bureau of Statistics of China, the data of six producer services FDI are drawn from the Provincial Statistical Yearbooks of 26 provinces in China.

Table 5.6: Variable Definition and Data Sources

Hypothesis 2

Variables	Definition	Source
FDI	Aggregate foreign direct investment	Chinese Ministry of Commerce
PSFDI	Producer services FDI	Provincial Statistical Yearbooks
GDP	Real gross domestic product (GDP)	China Statistical Yearbooks
AVERAGE WAGE	Average wage	CEIC database
TRADE BALANCE	Total value of all imports minus total value of all exports	China Statistical Yearbooks
CPI	Consumer price index	China Statistical Yearbooks
RECYCLING RATE	Harmless treatment rate of domestic garbage	Ministry of Housing and Urban-Rural Development of China
RESEARCH WORKER	The number of researchers	China Statistical Yearbooks
HOUSE PRICE	The price of commercial property	China Statistical Yearbooks
PASSENGER TRAFFIC	The total movement of passengers using inland transport on a given network	Chinese Ministry of Transport

5.3.2 Model specification

Hypothesis 2: The determinants of FDI inflows in the producer services sector are different from the general determinants of FDI inflows (using provincial level panel data).

To test ***Hypothesis 2***, we generate two equations, Eq. 5.3 and Eq. 5.4:

$$FDI_{i,t} = a_0 + a_1 GDP_{i,t} + a_2 AVERAGEWAGE_{i,t} + a_3 TRADEBALANCE_{i,t} + a_4 CPI_{i,t} + a_5 RECYCLINGRATE_{i,t} + a_6 RESEARCHWORKER_{i,t} + a_7 HOUSEPRICE_{i,t} + a_8 PASSENGERTRAFFIC_{i,t} + \varepsilon_{i,t} \quad \ldots\ldots\ldots (5.3)$$

$$PSFDI_{i,t} = \beta_0 + \beta_1 GDP_{i,t} + \beta_2 AVERAGEWAGE_{i,t} + \beta_3 TRADEBALANCE_{i,t} + \beta_4 CPI_{i,t} + \beta_5 RECYCLINGRATE_{i,t} + \beta_6 RESEARCHWORKER_{i,t} + \beta_7 HOUSEPRICE_{i,t} + \beta_8 PASSENGERTRAFFIC_{i,t} + u_{i,t} \quad \ldots\ldots\ldots\ldots (5.4)$$

In Eq. 5.3 and 5.4, the explanatory variables are the same: $GDP_{i,t}$ denotes real gross domestic product for province *i* at time *t*, $AVERAGEWAGE_{i,t}$ represents the average wage index for province *i* at time *t*, $TRADEBALANCE_{i,t}$ denotes the trade balance for province *i* at time *t*, $CPI_{i,t}$ refers to the CPI for province *i* at time *t*, $RECYCLINGRATE_{i,t}$ denotes the harmless treatment rate of domestic garbage for province *i* at time *t*, $RESEARCHWORKER_{i,t}$ denotes the number of workers who are involved in research activities for province *i* at time *t*, $PASSENGERTRAFFIC_{i,t}$ refers to the number of total movement of passengers using inland transport on a given network for province *i* at time *t*, and $HOUSEPRICE_{i,t}$ refers to the price of commercial property for province *i* at time *t*. However, the dependent variables are different: foreign direct investment (FDI) in Eq. 5.3 and producer service foreign direct investment (PSFDI) in Eq. 5.4. The coefficients a_0 and β_0 are the respective intercepts, and $u_{i,t}$ and $\varepsilon_{i,t}$ express the error term in the respective equations. a_1 to a_8 and β_1 to β_8, are the regression coefficients of each explanatory variable.

The regression method with Driscoll-Kraay standard errors (xtscc command program in Stata) is used for estimating these two models. The generation of such standard errors is further developed by Hoechle (2007) on the basis of the method proposed by Driscoll and Kraay (1998). As stated by Hoechle (2007, p. 28), "*Besides being heteroscedasticity consistent, these standard error estimates are robust to very general forms of cross-sectional and temporal dependence*". This new Stata program can be used not only for balanced panels but also for unbalanced panels and is capable of solving problems related to missing values automatically.

5.3.3 Empirical results for *Hypothesis 2*

Table 5.7: Fixed-effects Regression Estimates of the Determinants of Foreign Direct Investment and Producer Services Foreign Direct Investment in China, 1997-2017

	(1)	(2)
	FDI	PSFDI
	Fixed effects	Random effects
GDP	0.2732***	-0.0900
	(4.4093)	(-1.4812)
AVERAGE WAGE	-0.3976**	0.7973***
	(-2.4733)	(2.8580)
TRADE BALANCE	0.1559***	0.0016
	(5.1495)	(0.0424)
CPI	0.0846**	0.0962
	(2.4974)	(1.0245)
RECYCLING RATE	0.1873***	-0.2385*
	(2.9620)	(-1.6845)
RESEARCH WORKER	0.0325	0.2725***
	(0.4265)	(3.0642)
HOUSE PRICE	0.3116**	0.2293*
	(2.6843)	(1.6513)
PASSENGER TRAFFIC	-0.1304	-0.4231
	(-0.5401)	(-1.2725)
Constant	-9.2051**	-10.5473
	(-2.4872)	(-1.0861)
Observations	392	374
Number of groups	26	26
R-squared	0.5632	0.2444
Hausman test	28.47	5.0100
P-value for Hausman test	0.0004	0.8336

Note(s):: *p<.05, **p<.01, ***p<.001. Estimates use the 'xtscc' command in Stata 15.1 (Driscoll-Kraay standard errors in parentheses). Estimates use a maximum lag set to two years. The Hausman specification test is used to examine the null hypothesis that the random effects are consistent and efficient.

Table 5.7 presents the estimation results from fixed-effects and random-effects regression models with Driscoll-Kraay standard errors of ***Hypothesis 2***. The Hausman test indicates that for the FDI regression (column 1) the fixed-effects model is appropriate while for the PSFDI regression (column 2) random-effects should be used. We can see that, consistent with our *a priori* expectations, the significant determinants of aggregate FDI and PSFDI are different, and these results, which we take as more credible given the provincial level data they are drawn from, also differ slightly from those reported above using the ARDL model.

The results show that GDP, openness (proxied by trade balance), CPI, the recycling rate (as a proxy for environmental quality) and house prices, are all positive and significant on aggregate FDI at the 5% or 1% level. Significantly though, average wage is negatively signed and significant at the 5% level, with an estimated coefficient of -0.3976, indicating that for general FDI, the lower the wage costs the greater the level of inward FDI. However, for PSFDI, the average wage coefficient is positive and statistically significant at the 1% level, with an estimated coefficient of 0.7973. This result, therefore, is robust to panel method re-estimation using provincial level data and confirms that producer service foreign investors are more interested in seeking access to high levels of human capital rather than cheap labour which could end up compromising the quality of their services.

This result also aligns with the positive and significant (at the 1% significance level) ‘RESEARCH WORKER’ coefficient (0.2725) on PSFDI, which being measured by the number of research workers, serves as a good proxy for research intensity. Hence, highly skilled and educated workers, even if on a higher wage, are a key determinant of PSFDI but not of general FDI, where low labour costs are found to increase inward foreign investment.

Indeed, it has long been recognised that higher research intensity increases the confidence of foreign investors. The underlying explanation for this result is consistent with that put forward by Ito and Wakasugi (2007), who argued that, from a technology seeking perspective, human capital ought to be regarded as a key location determinant when foreign companies aim to access a foreign market's technologies. No other variable is found to have a significant effect on PSFDI at any reasonable significance level (1% or 5%).

5.4 Econometric Analysis for Testing Hypothesis 3: The Determinants of Producer Services FDI May Differ across Sub-sectors of Producer Services.

This section reports on a detailed empirical analysis concerning ***Hypothesis 3***, and offers a discussion of the results obtained**.**

5.4.1 Variable description

Table 5.8: Variable Definition and Data Sources

Hypothesis 3		
Variables	Definition	Source
TRANSPORTATION & STORAGE	FDI in tranportation and storage activities	Provincial Statistical Yearbooks
FINANCE & INSURANCE	FDI in finance and insurance activities	Provincial Statistical Yearbooks
RENTAL & LEASING	FDI in rental and leasing activities	Provincial Statistical Yearbooks
REAL ESTATE	FDI in real estate	Provincial Statistical Yearbooks
PROFESSINAL, SCIENTIFIC & TECHNICAL	FDI in professional, scientific and technical activities	Provincial Statistical Yearbooks
GDP	Real gross domestic product (GDP)	China Statistical Yearbooks
AVERAGE WAGE	Average wage	CEIC database
TRADE BALANCE	Total value of all imports minus total value of all exports	China Statistical Yearbooks
CPI	Consumer price index	China Statistical Yearbooks
RECYCLING RATE	Harmless treatment rate of domestic garbage	Ministry of Housing and Urban-Rural Development of China
RESEARCH WORKER	The number of researchers	China Statistical Yearbooks
PASSENGER TRAFFIC	The total movement of passengers using inland transport on a given network	China Ministry of Transport
HOUSE PRICE	The price of commercial property	China Statistical Yearbooks

5.4.2 Model specification

Hypothesis 3: The determinants of producer services FDI may differ across sub-sectors of producer services.

To test ***Hypothesis 3***, we generate five equations, Eq. 5.5 through to Eq. 5.9, where we disaggregate PSFDI into five producer services sub-sectors:

$$TRANSPORTATION\ \&\ STRORAGE_{i,t} = \gamma_0 + \gamma_1 GDP_{i,t} + \gamma_2 AVERAGEWAGE_{i,t} + \gamma_3 TRADEBALANCE_{i,t} + \gamma_4 CPI_{i,t} + \gamma_5 RECYCLINGRATE_{i,t} + \gamma_6 RESEARCHWORKER_{i,t} + \gamma_7 HOUSEPRICE_{i,t} + \gamma_8 PASSENGERTRAFFIC_{i,t} + \pi_{i,t} \ldots\ldots (5.5)$$

$$FINANCE\ \&\ INSURANCE_{i,t} = \varepsilon_0 + \varepsilon_1 GDP_{i,t} + \varepsilon_2 AVERAGEWAGE_{i,t} + \varepsilon_3 TRADEBALANCE_{i,t} + \varepsilon_4 CPI_{i,t} + \varepsilon_5 RECYCLINGRATE_{i,t} + \varepsilon_6 RESEARCHWORKER_{i,t} + \varepsilon_7 HOUSEPRICE_{i,t} + \varepsilon_8 PASSENGERTRAFFIC_{i,t} + \sigma_{i,t} \ldots\ldots (5.6)$$

$$RENTAL\ \&\ LEASING_{i,t} = \epsilon_0 + \epsilon_1 GDP_{i,t} + \epsilon_2 AVERAGEWAGE_{i,t} + \epsilon_3 TRADEBALANCE_{i,t} + \epsilon_4 CPI_{i,t} + \epsilon_5 RECYCLINGRATE_{i,t} + \epsilon_6 RESEARCHWORKER_{i,t} + \epsilon_7 HOURSEPRICE_{i,t} + \epsilon_8 PASSENGERTRAFFIC_{i,t} + \tau_{i,t} \ldots\ldots (5.7)$$

$$REALESTATE_{i,t} = \theta_0 + \theta_1 GDP_{i,t} + \theta_2 AVERAGEWAGE_{i,t} + \theta_3 TRADEBALANCE_{i,t} + \theta_4 CPI_{i,t} + \theta_5 RECYCLINGRATE_{i,t} + \theta_6 RESEARCGWORKER_{i,t} + \theta_7 HOUSEPRICE_{i,t} + \theta_8 PASSENGERTRAFFIC_{i,t} + \varphi_{i,t} \ldots\ldots (5.8)$$

$$PROFESSIONAL,\ SCIENTIFIC\ \&\ TECHNICAL_{i,t} = \vartheta_0 + \vartheta_1 GDP_{i,t} + \vartheta_2 AVERAGEWAGE_{i,t} + \vartheta_3 TRADEBALANCE_{i,t} + \vartheta_4 CPI_{i,t} +$$

$$\vartheta_5 RECYCLINGRATE_{i,t} + \vartheta_6 RESEARCHWORKER_{i,t} + \vartheta_7 HOUSEPRICE_{i,t} + \vartheta_8 PASSENGERTRAFFIC_{i,t} + \omega_{i,t} \ldots\ldots (5.9)$$

In Equations 5.5, 5.6, 5.7, 5.8 and 5.9, the explanatory variables are the same. $GDP_{i,t}$ denotes the real gross domestic product for province *i* at time *t*, $AVERAGEWAGE_{i,t}$ refers to the average wage for province *i* at time *t*. $TRADEBALANCE_{i,t}$ denotes the trade balance for province *i* at time *t*, $CPI_{i,t}$ denotes the CPI for province *i* at time *t*, $RECYCLINGRATE_{i,t}$ is the harmless treatment rate of domestic garbage for province *i* at time *t*, $RESEARCHWORKER_{i,t}$ denotes the number of workers involved in research activities for province *i* at time *t*, $PASSENGERTRAFFIC_{i,t}$ is the number of the total movement of passengers using inland transport on a given network for province *i* at time *t* and $HOUSEPRICE_{i,t}$ denotes the price of commercial property for province *i* at time *t*. The dependent variables are different: TRANSPORTATION & STRORAGE in Eq. 5.5, FINANCE & INSURANCE in Eq. 5.6, RENTAL & LEASING in Eq. 5.7, REAL ESTATE in Eq. 5.8, PROFESSIONAL, SCIENTIFIC & TECHNICAL in Eq. 5.9. The coefficients γ_0, ε_0, ϵ_0, θ_0 and ϑ_0 are the respective intercepts, and $\pi_{i,t}$, $\sigma i_{,t}$, $\tau_{,i,t}$, $\varphi_{i,t}$ and $\omega_{i,t}$ express the error term in the respective equations.

The sub-sectoral disaggregation of PSFDI shown in Eq. (5) through to Eq. (9) above, is based on the five main PSFDI sub-sectors. These five sub-sectors of PSFDI are highly representative since they collectively account for 94.25% of China's total inward PSFDI over our sample period (authors'own calculations based on data drawn from http://www.stats.gov.cn/tjsj/ndsj/).

Reassuringly, the definition of the 'Industrial classification for national economic activities' issued by the National Bureau of Statistics of China (2017) defines and classifies producer services sub-sectors in a way consistent with the 'International Standard Industrial Classification of all economic activities' (ISIC) issued by the United Nations' Department for Economic and Social Affairs (United Nations, 2008).

According to these classifications, ‘Transportation & storage’ refers to services related to the provision of passenger or freight transport, whether scheduled or not, by rail, pipeline, road, water or air and associated activities such as terminal and parking facilities, cargo handling, storage, etc. Included in this sub-sector is also the renting of transport equipment with driver or operator as well as postal and courier activities. ‘Finance & insurance’ refer to insurance, reinsurance and pension funding activities and activities to support financial services, the activities of holding assets such as activities of holding companies and the activities of trusts, funds and similar financial entities. ‘Real estate’ activities pertain to lessors, agents and/or brokers involved in selling or buying real state, renting real estate, providing other real estate services such as appraisal or acting as real estate escrow agents. The ‘Rental & leasing’ sub-sector covers administrative and support services activities that include the renting and leasing of tangible and non-financial intangible assets, including a wide array of tangible goods, such as automobiles, computers, consumer goods and industrial machinery and equipment to customers in return for a periodic rental or lease payment. Finally, ‘Professional, scientific & technical’ includes specialised professional, scientific and technical activities.

5.4.3 Empirical results for *Hypothesis 3*

Table 5.9: The determinants of Sub-sectors of Producer Services Foreign Direct Investment in China, 1997-2017

	(1) TRANSPORTATION & STORAGE	(2) FINANCE & INSURANCE	(3) REAL ESTATE	(4) RENTAL & LEASING	(5) PROFESSIONAL, SCIENTIFIC & TECHNICAL
	Random effects	Fixed effects	Random effects	Fixed effects	Random effects
GDP	-0.0058***	0.0130	-0.0053*	-0.0015	0.0033
	(-4.2253)	(1.5124)	(-1.7348)	(-1.5234)	(0.8033)
AVERAGE WAGE	0.0378***	0.0841**	0.0381***	0.0094	0.0176
	(5.5012)	(2.6902)	(2.5740)	(1.0715)	(0.7693)
TRADE BALANCE	0.0009	-0.0069*	0.0022	-0.0020***	0.0024
	(1.1661)	(-1.7569)	(1.2134)	(-4.1281)	(0.8690)
CPI	0.0038*	-0.0113	0.0043	0.0034*	0.0033
	(1.7669)	(-1.0818)	(0.8982)	(1.7376)	(0.4148)
RECYCLING RATE	-0.0176***	-0.0110	-0.0005	0.0017	-0.0038
	(-4.9741)	(-0.2664)	(-0.0770)	(0.4434)	(-0.3005)
RESEARCH WORKER	0.0052***	-0.0031	0.0133***	0.0045***	0.0186***
	(2.7397)	(-0.2978)	(3.0779)	(2.8677)	(3.2622)
HOUSE PRICE	0.0129***	-0.0288	0.0051	0.0012	-0.0024
	(3.5846)	(-1.4213)	(0.7009)	(0.2790)	(-0.1791)
PASSENGER TRAFFIC	-0.0056	0.0484	-0.0184	-0.0025	-0.0432**

	(-0.7376)	(0.7977)	(-1.1403)	(-0.4897)	(-2.0511)
Constant	-0.3906*	0.9486	-0.4840	-0.3617*	-0.3405
	(-1.7756)	(0.8820)	(-0.9737)	(-1.7661)	(-0.4182)
Observations	300	175	329	285	267
Number of groups	26	22	26	23	22
R-squared	0.3642	0.4221	0.2477	0.1414	0.2978
Hausman test	6.89	30.81	3.18	23.03	12.07
P-value for Hausman test	0.5480	0.0002	0.9569	0.0061	0.1593

Note(s)*:* *p<.05, **p<.01, ***p<.001. Estimates use the 'xtscc' in Stata 15.1 (Driscoll-Kraay standard errors in parentheses). Estimates use a maximum lag set to two years. The Hausman specification test is used to examine the null hypothesis that the random effects are consistent and efficient.

By and large, the sub-sectoral PSFDI results discussed above (Table 5.9) corroborate the aggregate PSFDI results reported in Table 5.7, with 'AVERAGE WAGE' and 'RESEARCH WORKER' being positively and significantly associated with PSFDI in three and four sectors, respectively, out of five.

There are a few other coefficients that are significant for individual sectors. For example, 'TRADE BALANCE' records a negative coefficient of -0.0020 under 'RENTAL & LEASING', significant at 1%. This negative effect may be due to the greater competition characterising the 'RENTAL & LEASING' sector as the sector becomes more open to trading activity and more commercially active (see, e.g., Fazekas, 2016). Likewise, 'HOUSE PRICE' is positive and significant (at the 1% level, with a coefficient magnitude of 0.0129) under the 'TRANSPORTATION & STORAGE' sector, which may be simply due to an indirect effect of greater development in urban and more populated areas. But these significant coefficients are sporadic and in the main pertain to isolated instances thus failing to indicate any consistent pattern.

5.5 Further Discussion of Results

This section provides a further critical discussion of the findings in relation to each of the three hypotheses tested and the significance of the insights gained in the context of what we knew from previous literature and what we have additionally learned from the new results of the analysis presented. The chapter probes deeper on how and why some of the results of the present analysis differ from some of those reported in previous empirical studies, offering plausible rationales for any discrepancies, also drawing from theoretical concepts reviewed earlier in the thesis.

With respect to **Hypothesis 1**, by employing the time series ARDL cointegration technique with a sample period from 2003 to 2018, some differences in the determinants of aggregate FDI and PSFDI in China were found. However, these results, being based on aggregate statistics from China's Ministry of Commerce, may not be fully reliable.

Accordingly, the models were re-estimated using panel data techniques also by means of an extended model specification with different data drawn directly from 26 Chinese provinces, an analysis which tests **Hypothesis 2**. Overall, these additional estimations

show that contrary to the typical factors attracting general FDI - including GDP, openness, low wages and environmental quality - the two key determinants of PSFDI inflows to China are high wages and research intensity.

These two key findings are worthy of further discussion. Starting with the effect of high wages, paying higher salaries to producer services practitioners is found not to discourage foreign investors' desire to invest in high wage cost locations/sectors. Evidently, the prospect of considerable future profits prompts investors to be willing to accept the extra cost for a skilled and educated workforce, a finding that has been confirmed by our data both from the country and provincial level analysis.

Another interesting finding emerging from testing **Hypothesis 2** is that regions with strong science development, with regular updating of scientific equipment and with increasing research investment, are more likely to appeal to foreign capital. Specifically, our empirical results indicate that the 'number of researchers' has a significant positive impact on PSFDI, as we expected. In contrast to other industries, the core characteristic of producer services sectors is the higher requirement for capabilities of innovation input, innovation implementation and innovation output. For producer services foreign enterprises, investing in regions with high research intensity can effectively reduce their expenditures on research and development (R&D) and employee training costs. If talents are in short supply, producer services companies have to invest heavily in training staff, which also involves a higher cost of time to be invested. For this reason, regions that are strong in technology and have excellent research development capabilities can ensure foreign investors' demand and encourage investment. Theoretically, the appeal of the regions with high research intensity and R&D inputs should be superior to the regions with general research performance (Bodman and Le, 2013). This is consistent with insights from the theory of economies of scale, which suggest that accessing markets with a certain level of research capability can make the best use of the available resources and expand the operation of producer services companies to the optimum scale (Lowe and Taylor, 1998; Griffith et al., 2004).

These core findings are corroborated by a further analysis testing **Hypothesis 3**, with data disaggregated across the main five sub-sectors of producer services, namely, 'Transportation & storage', 'Finance & insurance', 'Real estate', 'Rental & leasing' and 'Professional, scientific & technical'.

Foreign investors show different preferences to invest in sub-sectors of producer services. The combination of the requirement of a high input-output ratio, a reasonable resource allocation and the pursuit of profits, are all factors influencing the behaviours of foreign investors of producer services. However, clear patterns emerge from the data.

Our findings suggest that paying higher salaries to producer services practitioners in the 'Finance & insurance', 'Real estate' and 'Transportation & storage' sub-sectors, would not only *not* discourage PSFDI investors to invest in high wage cost locations but, in fact, act as a strong pull factor. It appears that the prospect of high profits prompts investors to be willing to accept the extra cost for a skilled and educated workforce, a finding that has been confirmed by our data from both aggregate country and provincial level analyses.

Similarly, investing in research and education and expanding the number of researchers is likely to attract much PSFDI in all producer services sub-sectors with the sole exception of 'Finance & insurance', a sub-sector that over our sample period has already enjoyed a high premium wage level, well above all other producer service sub-sectors.

5.6 Concluding Remarks

This study investigated whether the location determinants of Producer Service FDI (PSFDI) differ from those of aggregate FDI in China, also using provincial level FDI and PSFDI panel data and sub-sector disaggregated provincial level data of producer services. The purpose of this chapter was to present and discuss the empirical results with specific reference to testing the three hypotheses constituting the conceptual framework of this PhD study.

For *Hypothesis 1,* it is found that there are differences in the influencing factors (or determinants) of aggregate FDI and PSFDI. It is worth noting that the manufacturing industry business climate index (BCI) has a statistically positive impact on both of the two dependent variables. The number of dial-up internet users has a statistically negative impact on aggregate FDI. On the other hand, the increase in GDP and the average wage will induce growth of PSFDI, while the proportion of total trade in GDP shows a negative effect. The variables 'demand for skilled labour', 'exchange rates' and 'highway freight traffic', have no statistically significant impact on either of aggregate FDI or PSFDI.

For *Hypothesis 2,* we find that the average wage, harmless treatment rate of domestic garbage and the price of commercial property, have statistically significant impacts on both aggregate FDI and PSFDI. However, the average wage level has a statistically negative impact on aggregate FDI and a positive impact on PSFDI. In addition, there is a positive association between harmless treatment rate of domestic garbage and aggregate FDI while a negative relationship is found for PSFDI. With regard to the variables that have significant influences on the determinants of PSFDI but not on aggregate FDI, our results show that the number of research workers exerts significant effects on inward PSFDI, which highlights one of the peculiarities of the producer services industry, situating its characteristic as a knowledge-based sector.

For *Hypothesis 3,* this study further considers the determinants of PSFDI from a sub-sector perspective. We disaggregate PSFDI into five main sub-sectors and explore the determinants accordingly. We find that the determinants of FDI in the TRANSPORTATION & STORAGE, FINANCE & INSURANCE and REAL ESTATE sectors, are quite similar to those for aggregate PSFDI. The results indicate that the level of wages and research factors have significant impacts on PSFDI also at sub-sector level. Among all these variables, we should note that 'wage' and 'research' variables (the number of researchers) are always found to have strong and statistically significant positive effects on inward PSFDI at both aggregate and sub-sector level.

Chapter Six: Conclusion

6.1 Chapter overview

This last chapter of the PhD thesis provides a summary of findings, highlights the policy implications and states the contributions of the study. It also acknowledges the main limitations of the work and points to key avenues for future research. Specifically, Section 6.2 sums up the pivotal findings of this study, structured by research objectives (with the exclusion of 'Objective 5', relating to policy implications, which are dealt with in the following section). Section 6.3 spells out the key policy implications flowing from the study. Section 6.4 states the contribution the thesis makes to knowledge, theory and methodology, highlighting the originality and significance of this research. Section 6.5 offers an acknowledgement of the limitations of this PhD study and outlines promising avenues for future research. Finally, Section 6.6 presents the author's personal reflections on conducting this PhD study.

6.2 Summary of findings

This research aimed at answering the central research question: *What are the determinants of producer services FDI in China at country aggregate, and provincial, sub-sectoral levels?* This section provides an answer to this main question by summarising the key original findings of this research, structured by the objectives as set out in the Introduction chapter, including the three hypotheses subjected to empirical scrutiny.

6.2.1 Objective 1. *To perform a substantial critical literature review of the fundamental FDI theories and the influencing factors of aggregate FDI and producer services FDI by critically evaluating the relevant theoretical and empirical literature and deriving testable hypotheses.*

The critical review of existing literature confirmed that FDI plays a very important role in the present state of the global economy and that multinational firms are central to the ongoing globalisation process and are normally the vehicles for FDI. The review also highlighted that although many empirical studies have examined the determinants of FDI in manufacturing, services or both, much less attention has been devoted to the

factors influencing specifically FDI in producer services, particularly in the context of China, leaving a glaring gap to be filled by this research.

Since China's accession to the World Trade Organisation (WTO), FDI into China has gradually increased, making China, since the early 2000s, the world's largest FDI recipient. Over the past two decades, the scale of FDI in China's service industry has also expanded and so has the growth rate of producer services FDI (PSFDI), as shown in Chapter two. But the review also highlighted a significant shortcoming, with FDI concentrated too much on non-traditional service industries with higher profits such as real estate, indicating that the structure of FDI in China's service industry needs to be optimised and upgraded.

The above summarised data-based analysis provided clear grounds for justifying how investigating the determinants of inward PSFDI, also at sub-sectoral level, is not only important at a theoretical level, but also to gauge how better to leverage the attraction of high-value inward FDI in a country like China, whose economic growth contributes one quarter of global growth in output and international trade.

Significantly, the literature review also showed that most of the studies on the determinants of FDI examined, developed hypotheses that draw from theories of FDI in manufacturing since no full-blown theory of FDI in producer services exists. Some literature suggests that FDI theory, despite being mostly developed with specific reference to manufacturing FDI, could be used to explain FDI in services as well, and that most of the determinants can be expected to be similar (Dunning and McQueen, 1982). In the present PhD study, I challenged this view, aiming to investigate whether such an assumption holds by specifically testing whether the determinants of China’s PSFDI inflows are different from the general determinants of China’s FDI inflows. Indeed, there may be significant differences of determinants between general or manufacturing FDI and PSFDI.

6.2.2 Objective 2. *To develop a conceptual framework of testable hypotheses to address some specifics aspects related to the main research question*.

Following a comprehensive review of the theoretical and empirical literature of FDI determinants, including specific attention to the limited work carried out in the past on producer service FDI (PSFDI), the review culminated in the formal development of a conceptual and analytical framework based on three hypotheses to be tested empirically, as follows:

Hypothesis 1: The determinants of Chinese FDI inflows in the producer services sector are different from the general determinants of Chinese FDI inflows (using national level time series data).

Hypothesis 2: The determinants of China's producer services FDI inflows and total FDI inflows vary when using Chinese provincial level panel data.

Hypothesis 3: The determinants of Chinese producer services FDI inflows may differ across sub-sectors of producer services.

Hypotheses 1, 2 and 3, constitute the framework of hypotheses to be tested and the respective models were developed accordingly to ensure a comprehensive specification of variables that theory and/or prior empirical evidence have shown to be important in FDI or PSFDI determination. Inclusion of each variable selected was grounded on *a priori* expectations of a theoretical and/or empirical relationship.

6.2.3 Objective 3. *To collect the data and identify a suitable empirical methodology while acknowledging its merits and limitations.*

A mixed set of quantitative research approaches and data were used to examine the three proposed research hypotheses highlighted above. Quarterly time-series data ranging from 2003 to 2018, were obtained from different data sources, including the National Bureau of Statistics of China, Ministry of Commerce of China, CEIC Database, Ministry of Human Resources and Social Security of China, Ministry of Transport of China, Ministry of Industry and Information Technology, Provincial Statistical

Yearbooks, Ministry of Housing and Urban-Rural Development of China, Organisation for Economic Co-operation and Development and International Monetary Fund.

To assess the sensitivity of the results obtained from estimations of the determinants of China's FDI and PSFDI inflows based on time series data from the Ministry of Commerce of China (estimated using the ARDL bounds test cointegration model), I used provincial level PSFDI data obtained from China's provincial statistical yearbooks of the National Bureau of Statistics on a panel data model for the period 1997 to 2017. I collected the data from all the 26 provinces in China (31 Chinese provinces in total) that record inward PSFDI data in their provincial statistical yearbooks. The remaining five provinces which do not report any PSFDI inflows and that were, therefore, excluded from the present analysis, are: Jinlin, Shanghai, Hunan, Sichuan and Tibet.

Each methodology, namely the ARDL approach and panel data estimations, was chosen on the basis of its merits *vis-à-vis* alternatives, and their limitations were discussed in the methodology chapter and summarised in Sub-section 6.5 below (titled the 'Limitations and avenues for future research').

6.2.4 Objective 4. *To test the hypotheses and obtain valid and reliable estimation results pointing out any differences in the determinants of China's aggregate FDI inflows and China's producer services FDI inflows.*

Hypothesis 1: The determinants of Chinese FDI inflows in the producer services sector are different from the general determinants of Chinese FDI inflows (using national level time series data).

In order to investigate this first research hypothesis, I used national level time series data ranging from 2003 to 2018. The analysis proved that the determinants of FDI inflows in the producer services sectors do differ from the aggregate FDI inflows in China. Among the influencing factors, it is shown that the manufacturing business climate and profitability impact positively on both FDI and PSFDI, meaning that a favourable host business environment reflected in the development of the manufacturing industry encourages both inward FDI and PSFDI. Nevertheless, the exchange rate, the demand of skilled workers and the volume of highway cargos, are

found to have no tangible, significant effect on both FDI and PSFDI. A very significant result emerges from testing Hypothesis 1, which demonstrates that foreign investors are willing to pay a relatively high salary to recruit talented employees driven by the desire to obtain greater profits in the long run. Although this result differs from that obtained for aggregate FDI, where the variable 'WAGE' is not statistically significant, and it is not *prima facie* intuitive (given the widely held belief that foreign companies are drawn to China chiefly because of its lower labour costs), its interpretation has logical grounding, and constitutes a key novel finding of the present study. It can be affirmed that some segments of producer services, such as finance and insurance, research, and even real estate, are highly knowledge-intensive, and practitioners are accordingly paid a relatively higher wage in these sub-sectors.

Aside from that, we unveil a significantly positive relationship between GDP and PSFDI. Yet, this study found a statistically insignificant result in examining aggregate FDI determinants. It is found that trade openness has a significant negative influence on PSFDI, and it can be argued that the impact of trade openness on FDI varies depending on investors' motivation (e.g., export-oriented FDI, tariff-jumping FDI, etc.). A low inflation rate offers a favourable business climate for foreign investors, conducive to improving shareholder value, which can explain the result that CPI is found to have a significant impact on PSFDI.

Hypothesis 2: The determinants of China's producer services FDI inflows and total FDI inflows vary when using Chinese provincial level panel data.

The second hypothesis to test was to probe further on whether the determinants of Chinese FDI inflows in the producer services sector are different from the general determinants of China's FDI inflows by using provincial level panel data. Here I conducted a robustness check of the results obtained using time series data by using an alternative panel aggregate dataset drawn from 26 Chinese provinces, including PSFDI data obtained from the Chinese Provincial Statistical Yearbooks, with a sample period from 1997 to 2017. Furthermore, given the use of provincial level panel data, I employed fixed and/or random effects panel regressions, which allowed me to establish how method dependent the results obtained using the ARDL cointegration technique were. These further estimations to test Hypothesis 2 also allowed the extension of the

model specification by including additional variables thanks to the enhanced provincial level data availability.

Overall, these additional estimations showed that contrary to the typical factors attracting general FDI - including GDP, openness, low wages and environmental quality - the two key determinants of PSFDI inflows to China are high wages and research intensity. With respect to the former, paying higher salaries to producer services' practitioners was found not to discourage foreign investors' desire to invest in high wage cost locations/sectors. Instead, they are willing to accept the extra cost for a skilled and educated workforce. With respect to research intensity, testing Hypothesis 2 revealed that the 'number of researchers' has a significant positive impact on PSFDI. *Hypothesis 3: The determinants of Chinese producer services FDI inflows may differ across sub-sectors of producer services.*

The third empirical objective of this research was to analyse the determinants of China's PSFDI by employing sub-sectoral level panel data from 2003 to 2017. Saliently, the main point is that foreign investors are driven by different motivations when deciding to enter host countries across different industries, particularly so for FDI in producer services sub-sectors. This research places special emphasis on investigating whether the PSFDI determinants vary among sub-sectors, which can also be considered as an innovation in the current research field. The results of the estimations showed that the average wage level and the number of research workers are two key elements associated with foreign investors' decision making for PSFDI in most of the sub-sectors of producer services. In depicting the effects of the wage variable, the cost advantage is still an important contributor in attracting more foreign capital flowing to the TRANSPORTATION & STORAGE sector, FINANCE & INSURANCE sector and REAL ESTATE sector. With the concerted efforts of technological improvements, consumer demand, and low-cost competition, more and more automated machines are likely to replace labour in the transport sector, causing the number of jobs to decrease and low labour cost levels to be maintained. As things stand, China's real estate employment market is nearly full, with a shortage of high-quality professionals. This also results in the polarisation of average wages for real estate practitioners, with a relatively low wage for hiring average workers and outstanding management talents recruited via high salaries.

Results concerning the effect of 'research and development (R&D)' factors on FDI in producer services are found to be positive among four sub-sectors: TRANSPORTATION & STORAGE sector, REAL ESTATE sector, RENTAL & LEASING and PROFESSIONAL SCIENTIFIC & TECHNICAL sector. It is particularly evident that regions that engage in high levels of R&D are becoming attractive destinations for FDI, leading to the foregoing of these innovation benefits. For regions with mid to high research intensity, FDI appears to have an even greater influence, and the positive effects that derive from FDI will reinvigorate innovation and contribute to long-run R&D growth. Likewise, regions with greater R&D expenditure have stronger innovative capabilities than the others and are, therefore, likely to be equipped with the advanced technology absorbed through FDI.

The trade balance is found to have a negative impact on FDI in the 'RENTAL & LEASING' sector, which may be due to the greater competition characterising this sector as it becomes more open to trading activity and more commercially active. Similarly, for foreign investors who invest in the 'TRANSPORTATION & STORAGE' sector, an increasing house price becomes a crucial factor in the decision process. Notable findings regarding the environmental protection measures affecting FDI conclude that regions with less stringent environmental laws and regulations deserve extra points to attract more foreign capital, particularly in the 'TRANSPORTATION & STORAGE' sector.

6.3 Policy implications

Objective 5 of this research, as stated in the Introduction chapter, reads as follows: 'To put forward some targeted policy implications for Chinese policymakers for enhancing the attraction of producer services FDI'. This section explicitly addresses this final objective of the study.

Producer services play an increasing role in total Chinese FDI inflows, and their necessity for optimising the economic system performance in China has been given particular attention by policymakers. Expanding demand for attracting PSFDI rather than just attraction of general FDI due to the attributes associated with FDI in producer services matches national development objectives and the need for economic growth.

It is based on the perception of the prospective positive impacts (economic growth, technology spillover) of FDI outweighing its negative effects (environmental degradation, income inequality). A country's FDI strategy is determined by the government's development targets, together with the factor endowments and the degree of policy intervention. As a wise national authority, developing appropriate policies and procedures targeted at receiving more PSFDI takes up special importance in spurring the economy. An armory of possible FDI policies may affect the actual inflows in a broad policy spectrum once the strategy has been determined.

As referenced above, two important policy implications are proposed on the basis of the core findings of this research. First, it is established from our results that China's FDI attraction is driven by different factors compared to China's PSFDI attraction, which also means that boosting PSFDI inflows requires different policies and procedures. It is also important to have a precise assessment of each industry's specific features and to distinguish which kind of policy action is more appropriate to attract PSFDI inflows.

Second, our findings suggest that Chinese policymakers should implement specific policies to stimulate FDI to flow to those sub-sectors of producer services. Referring to 'the global war for talent', knowledge-intensive firms increase their demand for the best workers and are more willing to offer a higher wage. For example, it is found that offering higher salaries to exceptionally educated producer services' practitioners in the TRANSPORTATION & STORAGE sector, FINANCE & INSURANCE sector and REAL ESTATE sector will embolden PSFDI foreign investors to invest in high wage cost areas. In pursuit of soaring profit margins, investors are more inclined to accept the extra expenditure for recruiting skilled workforces, and this finding has been confirmed from both aggregate and provincial level data.

Analogously, there are a number of potential ways that FDI can impact innovation, including domestic firms exposed to superior technologies when foreign companies enter the host market and knowledge embodied in skilled workers can be circulated through worker mobility. For example, regions that invest in R&D and skills development, such as expanding the number of researchers and increasing research inputs, have good innovative performance and are more conducive to the technology

spillover effects stimulated by FDI. As such, investing in R&D development activities is more likely to attract more FDI in all producer services sub-sectors with the solitary exception of 'FINANCE & INSURANCE', a sub-sector that over our sample period has already enjoyed a high premium wage level, well above all other producer services sub-sectors.

6.4 Contributions to knowledge, theory and methodology

This section outlines the contribution to knowledge, theory and methodology and the significance of the contribution. This PhD thesis added to existing literature by investigating the still unsettled question of whether the determinants of Chinese inward PSFDI differ from those of aggregate inward FDI, and then, by delving into the question of the key determinants of PSFDI at sub-sector level.

First, in terms of the contribution to knowledge, the landmark finding of this study relates to the knowledge structures of the FDI determinants in China's FDI in producer services by providing compelling and robust empirical evidence. For example, the existing literature expounds that host countries with lower wages advantages attract more cost-seeking MNEs, and a fall in the unit labour cost encourages FDI (see, e.g., Markusen, 1984; Coughlin and Segev, 2000; Wu and Strange, 2000; Braconier et al., 2005; Wakasugi, 2005; Konings and Murphy, 2006; Bellak et al., 2008; Yin et al., 2014). However, the findings of this thesis revealed that higher wages appear to encourage foreign investors particularly drawn by the spirit of pursuing strong labour productivity and seeking highly educated workforces.

This finding reflects the significance of how the availability of skilled workers addresses foreign investors' interests when determining locations to invest in and how foreign firms' increasing demand for skilled workers push up the wages of highly skilled individuals. Similarly, it is found that regions with high research intensity, receive more FDI. On this basis, regions can proactively identify their potential for enhancing R&D capabilities and improve their innovativeness by attracting FDI.

But it should be noted that the significance of this thesis' contribution is not limited to offering knowledge on the main determinants of PSFDI, also at sub-sectoral level of

producer services and, as a result of this knowledge, of a clear roadmap of how to enhance PSFDI attraction. The contribution also lies in pointing out how the promotion of economic growth can be enhanced via inward PSFDI. Indeed, as recent evidence has shown, the development of the manufacturing sector too can benefit from inward PSFDI. For example, in their examination of the effect of territorial servitisation on the spatial development of the manufacturing sector in Northeast China and using data from 34 prefectural cities from 2003 to 2016, Liu et al. (2019) recently showed that the concentration of producer services promotes manufacturing agglomeration in the region, thereby confirming that enhancing inward PSFDI also benefits manufacturing agglomeration economies.

Second, in terms of contribution to theory, the present research showed that standard FDI theory postulating likely determinants of general FDI, needs to account for peculiarities pertaining to FDI in producer services. A most notable specificity that emerges from the present PhD study relates to the sign of the expected relationship between high wages and PSFDI which, unlike the theoretical prediction for general FDI, is positive in the case of PSDI.

Third, the advanced time series and panel data econometric methods employed in this research denote a contribution to methodology. The aggregate analysis examining Hypothesis 1 (H1) yields some surprising findings by using the ARDL bounds test cointegration model, and thus an extended and revised model specification (Hypothesis 2, H2) is employed to assess the sensitivity of the results obtained from H1 at the provincial level with the greater data availability for additional variables. Furthermore, in H2, the panel data analyses for robustness tests use FDI as well as PSFDI data derived from provincial level Chinese data (from the Provincial Statistical Yearbooks of 26 provinces in China) and then duly aggregated on the basis of the classification of service industries issued by China's National Bureau of Statistics, with a wider sample period from 1997 to 2017. Next, Hypothesis 3 (H3) is tested by using the same data source that is used to obtain sub-sector level data for PSFDI in relation to H2. An econometric issue likely to apply across the units of panel data in our analyses is cross-sectional dependence, which can arise due to spatial effects or unobserved common factors. Accordingly, I employ a fixed-effects method with heteroscedasticity, autocorrelation and spatial correlation consistent, robust standard errors that are constructed by Driscoll

and Kraay (1998). While these techniques are not new and have been used by other researchers in other contexts and settings, none of these techniques has been employed to date in the empirical analysis of the determinants of PSFDI in China.

6.5 Limitations and avenues for future research

Some argue that no PhD thesis can be perfect. That said, I can honestly say that I did all I could, to do as good a job as possible. Nevertheless, it is worth acknowledging several limitations of this research, limitations that also pave the way for useful extensions of the work by future studies.

First, as already noted in the methodology chapter, the analysis undertaken was heavily constrained by the limited availability of accurate, reliable data on the Chinese economy. I already discussed in the methodology chapter such problems, also citing Owyang and Shell (2017) who specifically examined the challenges to the Chinese data gathering and reporting process and put China's data quality within the context of other developing nations. However, all things considered, and mindful of such constraints in data availability, the present study at least tried to verify the obtained results by retesting the hypothesis of interest using data obtained from the Chinese Provincial Statistical Yearbooks, not just aggregate data from the Chinese Ministry of Commerce. Most importantly, at the current state of things, it is impossible for any other researcher to obtain better quality data than those used for this research.

Another set of limitations relates to the challenges and/or constraints posed by the econometric methods I used, which whilst being appropriate for what the research intended to accomplish, assumed a merely linear data generation process (DGP). This is certainly an area worth further analysis in future applied studies on the relationship between PSFDI and its determinants. For example, recent developments in non-linear cointegration techniques now make it possible to test for non-linear cointegration, for instance, within the nonlinear Autoregressive Distributed Lag approach by Shin et al. (2014), which could be usefully employed by future researchers interested in investigating potential nonlinearities in the relationship - and more specifically, asymmetries in the relationship between PSFDI and its determinants. Similarly, it could be very interesting to establish whether the relationship in question may be susceptible

to a threshold effect, since it is possible that the influence of individual determinants of PSFDI may vary depending on the level of inward investment in producer services.

Turning the attention to the results of this PhD study, another important and potentially profitable extension to the analysis I conducted here, could entail establishing whether there may be a geographic element to the finding that 'high wages are not a deterrent for FDI but actually act as a pull factor for PSFDI'. This provides a crucial 'avenue for further research' in terms of the possibility that this peculiar effect of high wages on inward FDI may or may not apply depending on regional variations in inward PSFDI in China in addition to reflecting the producer services sub-sectoral differences the present PhD study has highlighted. Indeed, it should be acknowledged that whilst the present research made use of data on PSFDI from the various provinces in China, the panel results were not disaggregated at provincial level to allow tractability. Nevertheless, such a disaggregated analysis across Chinese provinces may offer additional valuable insights.

Another aspect which fell outside the scope of this PhD study but that could be profitably investigated in future research relates to the possibility of bidirectional causality between producer services sector development and FDI. Indeed, while FDI has been acknowledged as a powerful vehicle to enhance the development of producer services, the development of a country's producer services sector can, in turn, stimulate further foreign investment into the sector. That said, the focus of the analysis of the PhD study was on the determinants of PSFDI and whether such determinants differ from those of general FDI.

Further comparative analyses of the differences between FDI and PSFDI are also encouraged to be conducted across other countries, particularly for other BRIC economies such as Brazil and India, that are receiving large amounts of FDI and PSFDI and whose producer services sectors are, like China, expanding rapidly (despite the recent slowdown in all FDI flows due to the Covid-19 pandemic).

Limitations and profitable avenues for future research notwithstanding, this thesis makes a significant original contribution to knowledge, in terms of differences in the

determinants of FDI and PSFDI in China, and to theory, in ways that pave the way for further theoretical and empirical examination.

6.6 Personal reflection

As my Director of Studies (DoS), Professor Glauco De Vita, said to me at the start of my doctoral journey, no thesis is ever perfect, "*but if you constantly strive to achieve perfection, chances are you'll at least end up with a very good thesis*". His advice never let me down over the past three years and I hope his words of wisdom prove correct also with respect to this statement. Most importantly, I am very proud of the thesis, its significant original contribution and all the challenges I had to overcome to reach this point. Not to mention the value of the personal and professional growth that has characterised my journey as a PhD student and aspiring scholar.

At my second year Progress Review, the Chair of the Progress Review Panel asked me why my PhD seemed to go so smoothly and how I could possibly make such good progress without any problems. Of course, this perception is not quite right. I too experienced many ups and downs and steep learning curves throughout the PhD, but I was able to overcome any challenges I faced. I think my start was key in my success, particularly because of the time I had spent thinking carefully about what topic I wanted to research and in searching for the ideal supervisor through the web pages of various universities.

So, yes, looking back, and with the benefit of hindsight, I can say that my desire to research the still highly under-researched topic of FDI in producer services, and my focus on China, was certainly a very good choice of topic to devote three years of my life to. Whilst FDI is undoubtedly one of the most studied topics in the fields of economics as well as international business, with thousands of articles published on the subject, it is still remarkable how little attention researchers have paid to date to the determinants of PSFDI, particularly for one of the largest recipient countries of FDI and PSFDI such as China. This choice allowed me to have a clear focus, identify an obvious gap in the literature, define a sufficiently narrow research question, and – ultimately – make an original contribution to knowledge that adds to what was known on the subject before I undertook my PhD study. It is the novelty of my research findings that also

allowed me to leave a mark in relevant literature with a publication (co-authored with my supervisors) in the second year of my PhD in the *Journal of Economic Studies*; an achievement that marked a very important milestone in my progress and helped build up my confidence as a young researcher.

I am also very happy with my choice of supervisor, another critical success factor in my PhD journey. I found Professor De Vita's details through my online searches for a top UK expert on FDI, someone who was highly published and with many successful PhD completions. Then I contacted him with what I thought was a well-crafted proposal. Little did I know, that we would then spend four months perfecting it before I submitted my PhD application officially to Coventry University (CU). His great help throughout that process, which included large amounts of feedback and several iterations of the academic proposal, proved that I had made a great choice in contacting him. His guidance and support have been immense throughout my doctoral journey. He was caring, a great motivator and his obsession with striving for excellence, contagious. I also need to mention the excellent support from other supervisors, Dr Yun Luo and Dr Jason Begley, who were also there for me every step of the way. It is also thanks to the amazing support of my supervisory team that I was able to complete and submit the thesis before the three-year mark.

My reflection could not avoid talking about the unusual and peculiar circumstances dictated by the prolonged periods of lockdown and social distancing measures that affected a large part of the period of my PhD. Fortunately, my sole use of publicly available, secondary economic data meant that my data collection process was not affected by the pandemic and related measures as some of my peers were (who, instead, were planning to do interviews and hence found themselves with significant difficulties to overcome to collect the necessary data). Nevertheless, the lockdowns and social distancing measures did reduce the amount of networking and discussions with peers I would have normally had. Peers can provide a significant network of support and information during a PhD, and the circumstances I found myself in, therefore, forced me to be even more determined and self-reliant. Of course, the lockdown meant that after months of working in solitude, there were moments when it was difficult to motivate myself. But I somehow managed to always find the strength to pick myself up. This has been a significant lesson and a crucial aspect of both my personal and

professional development, especially in terms of allowing me to discover and reinforce my resilience in the face of adversity.

From a purely academic point of view, the greatest difficulty I experienced was when I was running trial and error estimations that, initially, seemed to bring up more problems with the results than answers! At times, it felt like being in a dark tunnel I was never going to get out of. My DoS was very reassuring though, and I still remember his words citing his own supervisor at Cambridge University who said, "*econometrics is art as well as science*", meaning that there is inevitably a 'craft' in applying economic theory and statistical techniques to analyse economic data, and in the way the trial and error experimentation can allow the data to speak to us. Economics is not solely science! These words really spoke to me and helped me to get through weeks if not months of uncertainty as to what my findings would really tell us about the phenomenon under study, how significant the results would be and, ultimately, the story they would unveil. Fortunately, in the end, two main findings as discussed earlier in this chapter, emerged as being very original and significant, especially with respect to the role of high wages in affecting inward FDI in producer services.

Alongside the subject-specific learning that characterised my ongoing development, including learning much more about econometrics, specific methodological techniques (such as the ARDL method), their advantages and disadvantages, etc., there are so many other skills and competencies I developed. I am confident that these skills and competencies will prove immensely valuable in the rest of my life and career. These include project management, time management, managing my wellbeing, high level IT skills (including becoming a competent user of Stata) and information literacy (particularly in terms of literature searches and academic databases). That said, perhaps the most important skill developed over the past three years, was to become much better at academic writing in English. The large volume of academic articles that I have read since the start of my PhD have greatly improved my writing ability, but also my teaching experience with undergraduates and postgraduates here at CU. Additionally, the teaching course I completed during my time in Coventry helped me to constantly practice those skills, also verbally, to better articulate even complex ideas and concepts.

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