Thesis for Degree of Master of Arts

A Comparative Analysis of Determinants of Foreign Direct Investment in China: A Case of Guangdong and Jiangsu Provinces

by

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Department of Global and Area Studies

The Graduate School

Pukyong National University

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중국에 대한 외국인 직접 투자 결정 요인 비교 분석 :
광동성 및 장쑤성 사례

Supervisor: Prof. Utai Uprasen

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Contents

List of Tables

List of Figures

A Comparative of Analysis Determinants of Foreign Direct Investment in China: A Case of Guangdong and Jiangsu Provinces

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Abstract

In recent decades, with the rapid development of China's economy and the continuous enhancement of China's national strength, a large amount of foreign investments has poured into China after China’s reform and opening up. Therefore, foreign direct investment (FDI) plays an essential role in the economic growth of China as the FDI is one of main motivators of economic growth. By far, China has become one of the world's largest FDI recipients, with FDI stock second only to the United States. Although the total amount of FDI in China is very large. However, the spatial distribution of China's FDI is extremely uneven. The Eastern coastal region has always been an important area for China to absorb FDI. Among the Eastern coastal areas, Guangdong and Jiangsu provinces are consistently ranked first and second in the total amount of FDI in China. Guangdong province and Jiangsu province are the major economic provinces which absorbs the most FDI in China, whereas, they show the different development trends. Additionally, the rate of FDI growth of both provinces were low and even has drop currently. Therefore, for a better economic development in Guangdong province and Jiangsu province, it is necessary to know what are determinants of FDI between Guangdong province and Jiangsu province. For the empirical study, we adopt the Auto-Regressive Distributed Lag (ARDL) model with annual time-series data 1985-2019 for the estimation. In additional, we apply the Toda-Yamamoto Granger causality test to strength the reliability of empirical research results. The result shows that the factors of determinants FDI in Guangdong province are average wage, infrastructure and per capita GDP. The factors of determinants of FDI in Jiangsu province are average wage, education and per capita GDP.

Keywords: Economic growth, China, Foreign direct investment (FDI), Guangdong province, Jiangsu province, Auto-Regressive Distributed Lag (ARDL) model, Toda-Yamamoto Granger causality test.

중국에 대한 외국인 직접 투자 결정 요인 비교 분석 : 광동성 및 장쑤성 사례

Zheng Xuexia

국문 초록

최근 수십 년 동안 중국 경제의 급속한 발전과 중국의 국력이 지속적으로 향상됨에 따라 중국의 개혁 개방 이후 많은 외국인 투자가 중국에 쏟아졌습니다. 따라서 외국인 직접 투자 (FDI)는 중국 경제 성장에 중요한 역할을 하고 있는데, 외국인 직접 투자는 경제 성장의 주요 동기 중 하나이기 때문입니다. 지금까지 중국은 세계 최대의 FDI 수혜국 중 하나가 되었으며, FDI 주식은 미국 다음으로 두 번째입니다. 중국의 FDI 총액은 매우 많지만. 그러나 중국의 FDI 공간 분포는 매우 고르지 않습니다. 동부 해안 지역은 항상 중국이 FDI 를 흡수하는 중요한 지역이었습니다. 동부 해안 지역 중 광동성과 장쑤성은 중국의 총 FDI 총액에서 지속적으로 1 위와 2 위를 차지하고 있습니다. 광동성과 장쑤성은 중국에서 가장 많은 외국인 직접 투자를 흡수하는 주요 경제성이지만, 다른 개발 동향을 보여줍니다. 또한 두 지방의 FDI 성장률은 현재 느리고 심지어 하락하기도 합니다. 따라서 광동성과 장쑤성의 더 나은 경제 발전을

위해서는 광동성과 장쑤성 간의 FDI 결정 요인이 무엇인지 알아야합니다. 실증적 연구를 위해 추정을 위해 연간 시계열 데이터 1985-2019 와 함께 자동 회귀 분산 지연 (ARDL) 모델을 채택했습니다. 또한 경험적 연구 결과의 신뢰성을 강화하기 위해 Toda-Yamamoto Granger causality 테스트를 적용합니다. 결과는 광동성의 FDI 결정 요인이 평균 임금, 인프라, 1 인당 GDP 라는 것을 보여줍니다. 장쑤성의 FDI 결정 요인은 평균 임금, 교육, 1 인당 GDP 입니다.

키워드: 경제 성장, 중국, 외국인 직접 투자 (FDI), 광동성, 장쑤성, 자동 회귀 분산 지연 (ARDL) 모델, Toda-Yamamoto Granger 인과 관계 테스트.

Declaration

I ZHENG XUEXIA, declare that to my best knowledge, the dissertation I submitted is the outcome of my independent study under the guidance of my supervisor. This work is original represent my research and analysis, and no other degree has been published or submitted to any other university for award.

ZHENG XUEXIA

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First of all, I would like to thank my supervisor Prof. Utai Uprasen very much. Because of his patience and careful guidance on my study step by step, make me to complete this thesis successfully. Again, thank you very much for Prof. Utai Uprasen's efforts and encouragement to me.

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Last but not the least, thank my family for their support. Thank them for inspiring me to move forward.

This dissertation is dedicated to my families, many thanks them for their supporting, caring, helping and encouraging. Meanwhile, this work also dedicated to my supervisor Prof. Utai Uprasen who guided me a lot on the study. Many thanks for Prof. Utai Uprasen having faith in me and his persistent guidance helped me to finish my studies and my master thesis successfully.

Chapter 1

Introduction

1.1 Background of Study

Foreign Direct Investment (FDI) refers to the investment behavior in which investors in one country or one region use capital in the production or operation of another country or region and have specific control over the process. FDI is one of the primary forms of modern capital internationalization. Refers to an investment in which a company operating in a country other than the investor's home country has continuous interests. It intends to have a say in a company's operation and management. FDI is one of the primary forms of modern capital internationalization.

In recent decades, with the economy of China development rapidly and the continuously enhancement of China's national strength, many foreign investments had poured into China. By 2016, FDI in China had reached 9.75 billion USD, surpassing most other countries in the world. There is no doubt about this FDI has provided a powerful impetus to China's development, and it has also influenced China's economic development framework. By far, China has become one of the largest recipients of FDI in the world, with FDI stock second only to the United States.

Xu (2018) found that with the accelerated pace of economic globalization and the in-depth implementation of China's reform and opening policy, FDI has become a vital channel to utilize foreign capital in China. And it's a contribution to China's Gross Domestic Product (GDP) has shown more and more obvious advantages. Therefore, the evolution of the FDI environment in recent decades plays an essential role in the development of the domestic economy and may become the wind vane of the trend of China's economy. The study of Fung et al. (2004) also states that the roles of FDI in China's economy in two decades after reforms and opening up, remarkable progress has been made by China in three aspects. Firstly, economic reforms have transformed China from a soviet-style centrally planned economy to a primarily market-based economy. Secondly, China has shifted from an isolated economy to an economy that is highly integrated with the world. Last but not least, China achieved impressive economic growth such as from 1978 to 2002, the GDP and PGDP of China have grown by 9.40 percent and 8.00 percent annually on average, respectively. Additionally, the empirical study of Kim (2006) indicates that the inflow of foreign capital is conducive to China's economic growth.

The positive impact of FDI on China's economic growth mainly includes six aspects: first, it increasing domestic investment and promoting capital formation. Second, it can absorb the labor force for employment. Third, it improves the total factor productivity of comprehensive factor productivity. Fourth, it promotes the upgrading of China's industrial structure. Fifth, it expands the scale of China's foreign trade, China's foreign trade structure and encourages the development of foreign trade. Sixth, it is an essential source of tax revenue for China.

Since the reform and opening-up, China's utilization of FDI has been overgrown. In 1979, China's actual utilization of FDI was almost zero, but in 2019, this index increased to 152.20 billion RMB. At present, China has become the developing country attracting the most FDI in the world. Despite China's remarkable achievements in using FDI in recent decades, the regional distribution of FDI in China is hugely uneven. The vast majority of FDI flows into China are concentrated in the eastern coastal region, while the inland region attracts only a small amount of FDI. In addition, in the Eastern coastal area, Guangdong and Jiangsu provinces have been the first and second ones in China regarding FDI after the reform and opening up.

Since the late 1970s, Guangdong province has taken the lead in China's reform and opening up and made brilliant achievements that have attracted worldwide attention. And the FDI of Guangdong province has always been the first one in China for decades. FDI is one of the propelling forces for the rapid economic development of Guangdong province. FDI has exerted a significant impact on many aspects of Guangdong province’s economic development, such as industrial structure, technological progress, international trade, taxation, employment, environment, human capital, etc. Guangdong province has a unique geographical location. It is adjacent to Hong Kong, China, and enjoys convenient coastal and sea transportation. Therefore, FDI in Guangdong province mainly comes from Hong Kong, China, Virgin Islands, Japan, and other Asian countries and regions. FDI from Hong Kong, China occupies a dominant position.

Since the reform and opening up, the economic development of Jiangsu province has been in the leading position in China. From 1979 to 1993, the average GDP growth rate of Jiangsu province was 11.7 percent, which 2.4 percent points higher than the national intermediate growth level. Moreover, Jiangsu province has also made outstanding achievements in attracting FDI. The FDI in Jiangsu province has made up for the shortage of construction funds, introduced advanced technology, promoted the adjustment of Jiangsu industry, expanded the export capacity, and driven the open economic development of Jiangsu province. The sources of foreign investment in Jiangsu province mainly concentrated in Hong Kong, China, South Korea, Singapore, Taiwan, and Japan. Among them, Hong Kong China is a region with the most foreign investment in Jiangsu province, accounting for more than half of the total, about 60 percent.

Although the number of FDI in Guangdong and Jiangsu province is growing, the growth rate is slowing, especially in Guangdong province. In 2003, Jiangsu province surpassed Guangdong province in the actual utilization of FDI for the first time and becoming the province with the most consideration utilization of FDI in China. Since Jiangsu province exceeded Guangdong province in 2003, Jiangsu province was higher than Guangdong province in terms of both the proportion of FDI in China and the growth rate of FDI. Furthermore, the growth rate of FDI in both areas is low and even drops years currently.

1.2 Research Questions

There are two questions in our studies. The first one is we want to know what determinants the FDI inflows to Guangdong province. The second one is we want to know what determinants the FDI inflows to Jiangsu province.

1.3 Research Objectives

Based on above questions, the objectives of our studies have two as well. There are:

First, this thesis is aims to analyses the determinants of inward FDI in Guangdong province.

Second, this thesis is aims to analyses the determinants of inward FDI in Jiangsu province.

1.4 Research Hypothesis

In this thesis, there are six variable determinants of inward FDI in Guangdong and Jiangsu province. They are average wage, infrastructure, education, trade openness, per capita GDP, and tertiary industry. We expect the average wage has a negative relationship for FDI inflows to Guangdong and Jiangsu provinces. The rest of the five variables: infrastructure, education, trade openness, per capita GDP, and tertiary industry, are expected to have positive relationships with FDI inflows to Guangdong and Jiangsu provinces.

1.5 Research Structure

There are six sections in this study. The first chapter presents the general information regarding how FDI inflows to China and how FDI inflows to Guangdong and Jiangsu provinces in China. The research question, research objective, research hypothesis, and research structure are described in this chapter.

The second chapter demonstrates the existing circumstances of FDI in China and detail introduces the differences between FDI and other factors in Guangdong and Jiangsu province.

The Third chapter illustrates the literature reviews, which consist of theoretical and empirical studies about this study. According to the literature review, we summarize the variables we adopted and the theory we used.

The fourth chapter introduces the specification of models of this study and describes the data and its source, also introduces the definition of those six variables.

The fifth chapter explains the empirical studies and the results.

The sixth chapter summarizes this study and makes the policy recommendations for Guangdong and Jiangsu provinces, respectively.

Chapter 2

Foreign Direct Investment in Guangdong and Jiangsu Provinces

This section demonstrates the situation of FDI in China and describes the FDI in Guangdong and Jiangsu provinces, respectively.

2.1 FDI in China

FDI plays a considerable role in the economic growth in China as the FDI is one of the crucial motivators of economic growth. To attract more FDI is the central policy for many developing countries in the world. Which including China. Yong and Gong (2010) state that the FDI is the most critical and complex strategy for international enterprises and the host country in globalization nowadays. Because it can bring the assets of foreign bring the new technologies, new industries, new management. For developing countries, there are constraints such as a relative lack of funds and relatively backward technology. Therefore, FDI has a great significance to developing countries.

Many studies had found that FDI have an impact on the economic growth of China. Such as Tang (2013) applied time-series data from 1983 to 2011, which from the national bureau of the statistic of China illustrates that FDI increases by 1 percent, the economic growth of China augment by 0.82 percent in the empirical tests. Based on the Almon Distributed Lag model with annual time-series data from 2003 to 2012, Xin et al. (2016) indicated that the FDI rose by 1 percent, the economic growth of China improved by 0.95 percent. Cao and Shen (2018) utilized VAR model with time series data 1985-2015, demonstrates that FDI plays a prominent role in promoting economic growth and other aspects of China. This shows the effectiveness of China's policy of "bringing in" after the reform and opening up, and also proves that China needs to continue to open up to a greater extent in the future, integrate into the world economy, and participate in global competition, which requires broader and deeper practices.

In general, FDI recovers the shortage of capital of China, which acquires advanced technology and absorbs the advanced management experience from developed countries. Since the reform and opening up, FDI has enabled China to gain valuable capital accumulation. More importantly, it has also brought advanced technology and scientific management experience and international market and international competition. For FDI flows into China, there are three progressive stages present as follows.

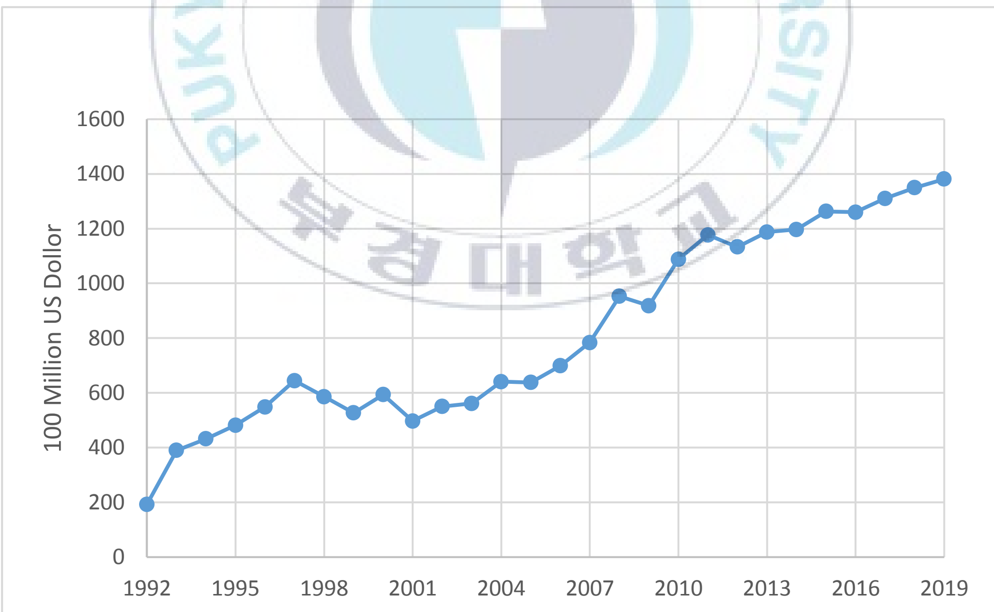
The first stage (1979 -1991): It was the beginning and initial development of FDI. In 1978, China's implementation of the reform and opening policy had opened the door for China to attract foreign investment. Because it is in the initial stage and there are policy changes and restrictions on the degree of market openness, foreign capital enters the Chinese market is a small-scale tentative investment and mainly for joint ventures. The actual total investment in the 1980s was less than 6.00 billion USD.

The second stage (1992-1996): The rapid growth of FDI. FDI has entered a period of rapid expansion since the mid-1990s. As the domestic market continues to open up and foreign restrictions gradually cancel, the FDI has been triggered a climax.

The third stage (1997-nowadays): FDI has steadily developed and adjusted. China has attracted a large amount of foreign investment and becomes a veritable foreign investment attraction country after decades of practical exploration of reform and opening-up. Although the financial crisis and global economic downturn during the period cast a shadow on FDI in Asia and even the world, its adverse impacts on China's investment promotion are limited.

After the reform and opening, the growth of inward FDI of China is rapid. Base on the UNCTAD's World Investment Report 2019, the FDI to East Asia rose by 4 percent to USD 2800 billion in 2018, and China is the largest developing economy recipient. China has increased by 4 percent, accounting for about USD1390 billion at an all-time high and 10 percent higher than the world's total. See in the < Figure 2.1.1 > shows the total FDI inflows in China from 1992 to 2019.

< Figure 2.1.1 >. Total FDI Inflows to China (1992-2019)



Source: Calculated by the author using data from National Bureau of Statistics of China.

Hence, China absorbs a lot of FDI and promotes economic growth after the reform and opening up. < Table 2.1.1 > presents the top 10 sources of FDI inflows to China from 1997 to 2019. The Top one to ten is United States, Netherlands, United Kingdom, Germany, Hong Kong, China, France, Singapore, Virgin Islands, Australia, and the Cayman Islands. For Virgin Island, it becomes the top ten resource FDI of China. The reasons are as follows.

The first one is in the British Virgin Islands, the political, economic, and trade environment is very stable. Second, it has sound financial and legal facilities to facilitate the establishment and development of various financial institutions or foundations. Third, the local government protects the interests of shareholders and does not need to disclose the identities of beneficiaries; Fourth, the company is protected by the local government's privacy ordinance, and directors and data of banks can be kept confidential. Fifth, overseas companies do not have to pay tax every year. Sixth, to encourage economic development and attract foreign investment, the island's local government can own a limited company completely. Seventh, the low tax rate and island International Limited is subject to very little tax control. Eighth, no report of auditor is required, but the information is retained to reflect economic conditions. Ninth, the profits from overseas operations are not subject to profits tax, and reasonable tax avoidance can be achieved in the triangular trade. Then, island businesses can open bank accounts anywhere in the world. Therefore, many Chinese enterprises registered companies and then invest in China again.

China is rich in resources, but many foreign companies are investing in China in different directions.

< Table 2.1.1 >. Top 10 Sources of FDI Inflows of China (1997-2019)

No.	Country/Region	Total Amount (10 billion US dollar)	Share of FDI Inflows to China (%)
1	United States	6,182,565	20.05
2	Netherlands	3,594,080	11.66
3	United Kingdom	2,504,998	8.12
4	Germany	1,683,245	5.46
5	Hong Kong, China	1,519,924	4.93
6	France	1,041,440	3.38
7	Singapore	991,093	3.21
8	Virgin Islands	838,499	2.72
9	Australia	798,061	2.59
10	Cayman Islands	429,994	1.39
Top 10	-	19,583,899	63.51
ROW	-	11,251,201	36.49
Total	-	30,835,100	100

Note: ROW means the Rest of the World.

Source: Calculated by the author using data from The World Bank.

< Table 2.1.2 >. Distribution of FDI Inflows Across Industries of China (2008-2018)

Industry	Utilized FDI (%)	Industry	Utilized FDI (%)
Manufacturing	37.95	Agriculture, forestry, animal husbandry and fishery	1.36
Real estate	20.59	Construction	1.25
Leasing and business services	9.40	Services to households and other Services	0.86
Wholesale and retail trade catering industry	7.52	Management of water conservancy, environment and public facilities	0.55
Information transmission, computer service and software industry	4.49	Mining	0.55
Financial Intermediation	4.29	Culture and art, radio, film and television industry	0.48
Transportation, storage, post and telecommunications	3.74	Health and social work	0.11
Scientific research and technical service industry	3.26	Education	0.03

Production and supply of electricity, gas and water	2.10	Other industry	0.0032
Hotels and catering services	1.46	Total	100

Source: Calculated by the author using data from National Bureau Statistics of China.

The < Table 2.1.2 > shows the distribution of FDI inflows across industries of China in 2008-2018. It indicates that FDI inflows to China mainly concentrate on the industry. The first is manufacturing, which accounts for 37.95 percent, the second is real estate, which accounts for 20.59 percent, the third is leasing and business services which account for 9.40 percent. Among three industries are add up to more than 60 percent. The rest of each sector are accounts for less than 5 percent, which total to no more than 40 percent.

2.2 FDI in Guangdong and Jiangsu Province

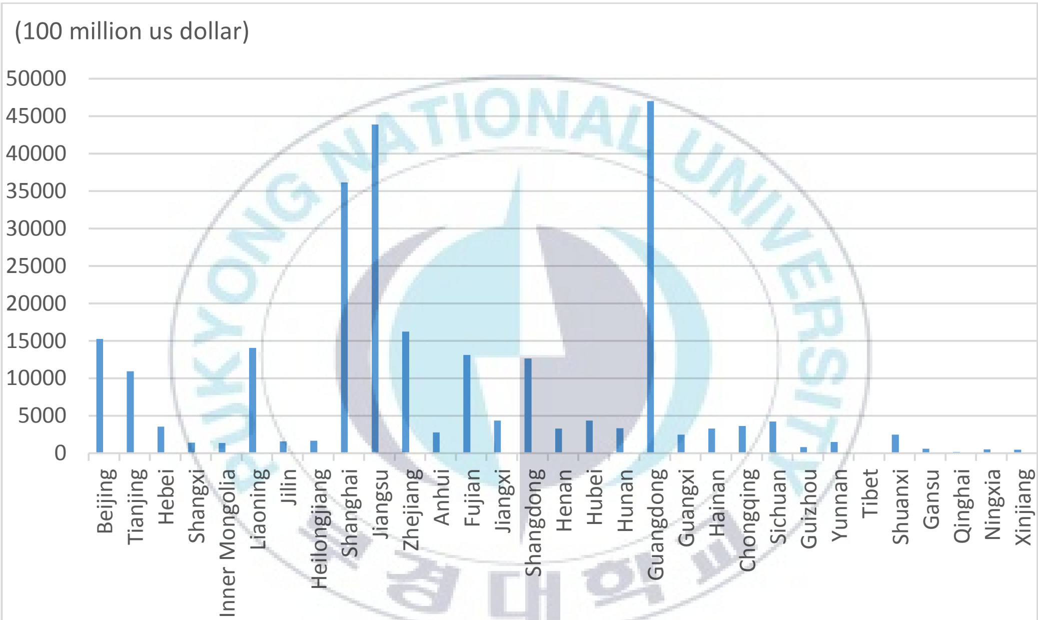
Although the total amount of FDI in China is tremendous. However, the spatial distribution of China's FDI is highly uneven. The eastern coastal region[1] has always been an important area for China to absorb FDI. Among the eastern coastal regions, Guangdong and Jiangsu provinces are consistently ranked top two in total FDI in China see in the < Figure 2.2.1 >. The first one is Guangdong province, and the second one is Jiangsu province. Expect the

[1] . Eastern coastal area include: Shandong, Hebei, Tianjin, Liaoning, Jiangsu, Zhejiang, Fujian, Shanghai, Guangdong, Hainan.

Shanghai, the total inward FDI in Guangdong and Jiangsu province is much higher than others. This illustrates that the Guangdong and Jiangsu provinces are crucial to attracting FDI in China.

Additionally, the findings of Zhang and Lee (2014) noted that the regional FDI have significantly positive impacts on regional economic growth by using

< Figure 2.2.1 >. Total FDI Inflows to Province Level of China (1997-2018).



Source: Calculated by the author using data from National Bureau of Statistics of China.

the Pooled Ordinarily Least Square (OLS) and cross-section fixed effect model with Chinese provincial panel data for estimation. This is means that the FDI also boots the economic growth for both Guangdong and Jiangsu provinces. Furthermore, Kim and Park (2014) applied Granger causality test to found out that FDI and Gross Regional Domestic Product (GRPD) has a causal relationship in eastern China[2].

< Table 2.2.1 >. Top 10 Sources of FDI Inflows of Guangdong Province in 2019

No	Country	Total Amount (10,000 US dollar)	Share of FDI Inflows (%)
1	Hong Kong, China	674,883	65.67
2	United States of America	26,480	2.58
3	Cayman Islands	26,123	2.54
4	Singapore	19,221	1.87
5	Cambodia	9,204	0.90
6	Virgin Islands	7,953	0.77
7	Australia	7,725	0.75
8	Vietnam	6,990	0.68
9	Germany	5,297	0.52
10	New Zealand	4,942	0.48
	Total	788,818	76.76

Source: Calculated by the author using data from Guangdong Statistical Yearbook.

2 . Eastern China including provinces are Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong.

The < Table 2.2.1 > presents the top 10 sources of FDI inflows of Guangdong province in 2019. The < Table 2.2.1 > declares that Hong Kong, China is the top one and shares the most FDI inflows to Guangdong province, accounting for 65.67 percent. That means the FDI of Guangdong province is primary from Hong Kong, China. The second and third nations are the United States of America and Cayman Islands, accounting for 2.58 percent and 2.54 percent, respectively. The rest of the country are Singapore, Cambodia, Virgin Islands, Australia, Vietnam, Germany, and New Zealand that they are occupied for 1.87 percent, 0.90 percent, 0.77 percent, 0.75 percent, 0.68 percent, 0.52 percent, and 0.48 percent, respectively. The total of inwards FDI to Guangdong province of those ten countries are accounting for 76.76 percent.

The < Table 2.2.2 > presents the top 10 sources of FDI inflows of Jiangsu province in 2019. The < Table 2.2.2 > declares that Hong Kong China is the top one and shares the most FDI inflows to Jiangsu province, which account for 57.41 percent. It was less than Guangdong province, but Hong Kong China still is the first one for Jiangsu province as Guangdong province. For this, we can clearly know that Hong Kong, China, and one of the most significant sources of FDI inflows to China. The second and third nations are Korea and Singapore, which occupy 5.23 percent and 5.20 percent, respectively. The rest of country are Taiwan, China, Japan, the United States of America, Germany, the United Kingdom, France, and Switzerland that they are account for 3.87 percent, 3.50 percent, 2.22 percent, 1.27 percent, 1.22 percent, 0.52 percent, and 0.49 percent, respectively. The total of inwards FDI to Jiangsu province of those ten countries are accounting for 80.93 percent. Compare the < Table 2.2 > with < Table 2.3 > explains the FDI inflows to

Guangdong and Jiangsu province basically are from different countries expect the Hong Kong China.

< Table 2.2.2 >. Top 10 Sources of FDI Inflows of Jiangsu Province in 2019

No	Country	Total Amount (10,000 US dollar)	Share of FDI Inflows (%)
1	Hong Kong, China	1,499,818	57.41
2	Korea	136,552	5.23
3	Singapore	135,856	5.20
4	Taiwan, China	101,202	3.87
5	Japan	91,458	3.50
6	United States of America	58,052	2.22
7	Germany	33,265	1.27
8	United Kingdom	31,911	1.22
9	France	13,690	0.52
10	Switzerland	12,675	0.49
	Total	2,114,479	80.93

Source: Calculated by the author using data from Guangdong Statistical Yearbook.

Regards < Table 2.2.3 > describes the indicators for Guangdong and Jiangsu province in 2019. For the GDP, Guangdong and Jiangsu province accounts for the proportion of the whole country are 10.11 percent and 10.10 percent, respectively, they were similar the same in 2019. For the PGDP, Guangdong and Jiangsu province accounts for the proportion of the whole country is 132.84 percent and 174.36 percent, respectively, both provinces are highly exceeded the average PGDP of China. And this also reflects Guangdong and Jiangsu province are economically developed areas. For the population, Guangdong and Jiangsu province accounts for the proportion of the whole country are 8.23 percent and 5.80 percent, respectively. For the region, Guangdong and Jiangsu province accounts for the balance ratio of the entire country are 1.87 percent and 1.10 percent, respectively. For the total retail sales of consumer goods, Guangdong and Jiangsu province accounts for the proportion of the whole country are 9.66 percent and 9.20 percent, respectively. For the total export and import, Guangdong and Jiangsu province accounts for the proportion of the whole country are 22.64 percent and 13.70 percent, respectively. For the investment in real estate development, Guangdong and Jiangsu province accounts for the proportion of the whole country are 18.09 percent and 9.10 percent, respectively. For the grain output, Guangdong and Jiangsu province accounts for the proportion of the whole country are 1.87 percent and 5.60 percent, respectively. For the steel production, Guangdong and Jiangsu province accounts for the proportion of the whole country are 3.74 percent and 11.80 percent, respectively. For the local public budgetary revenue, Guangdong and Jiangsu province accounts for the proportion of the whole country are 8.88 percent and 8.70 percent, respectively. Both provinces show the same similarity for this.

Regarding the FDI in the provincial level of China, in the beginning, Guangdong province was the one that attracts the most FDI in China as it became one of the first regions of China to open to the outside world, which Guangdong province has many advantages in attracting FDI in the early stage.

The actual use of FDI in Guangdong province increased continuously and rapidly in 1992-2003, and it is the top one which is the province that utilized FDI in China from 335 (100 million dollars) USD to 1558 (100 million dollars) USD. In 2003-2006, the growth rate of inward FDI in Guangdong province was decline and instability. From 2006 to 2015, the growth rate of inward FDI in Guangdong province was increased but slowly. However, from 2015 until now, the growth rate of inward FDI in Guangdong province dropping out again.

< Table 2.2.3 >. Indicators for Guangdong and Jiangsu Province in 2019

Indicators	Guangdong	Guangdong accounts for the proportion of the whole country (%)	Jiangsu	Jiangsu accounts for the proportion of the whole country (%)
GDP (100 million yuan)	99,945.22	10.11	99,631.52	10.10
PGDP (yuan)	94,172	132.84	12,3607	174.36
Population (10000 persons)	11,521	8.23	8,070	5.80
Area (10000 square kilometers)	17.96	1.87	10.72	1.10

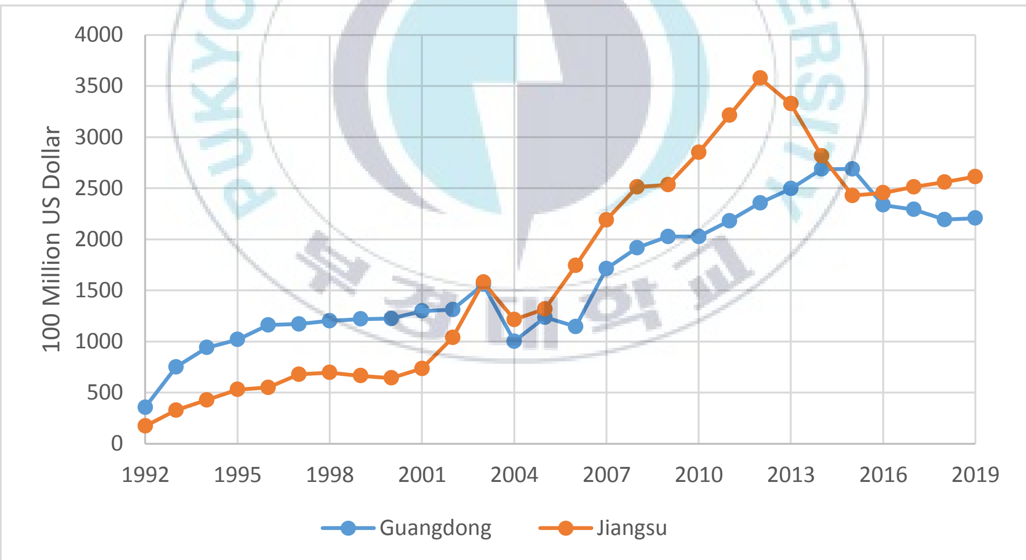
Total retail sales of consumer goods (100 million yuan)	39,767.11	9.66	37,672.51	9.20
Total export & import (100 million yuan)	714,14.89	22.64	43,379.73	13.70
Investment in real estate development (100 million yuan)	23,908.05	18.09	12,009.35	9.10
Grain output (10000 tons)	1,240.80	1.87	3,706.20	5.60
Steel production (10000 tons)	4,510.45	3.74	14,211.41	11.80
Local public budgetary revenue (100 million yuan)	8,974.45	8.88	8,802.36	8.70

Source: Calculated by the author using data from Guangdong Statistical Yearbook and Jiangsu Statistical Yearbook.

For Jiangsu province relies on its late-comer advantages and continuously increased its use of foreign capital. In 2003, Jiangsu Province actually used 1580 (100 million dollars) USD in FDI, which surpassing Guangdong province for the first time. And become the province that utilizing the largest foreign direct investment in China see in the < Figure 2.2.2 >. The growth rate of FDI in Jiangsu province declined in 2003-2004, but it still higher than in Guangdong province. In 2005-2012, the growth rate of FDI in Jiangsu province rose quickly and exceeded Guangdong province from 1318 (100 million dollars) USD to 3576 (100 million dollars) USD. But the growth rate of FDI in Jiangsu province decrease seriously in 2012-2015. From 2015 until now, it increased back again but very tardiness, which also surpasses Guangdong province.

After that, the FDI in Jiangsu province keeps surpassing Guangdong province. Only in 2015 Guangdong province exceeded Jiangsu province. But then Jiangsu province surpasses Guangdong province again from 2016 until now. However, the growth of FDI in Guangdong province and Jiangsu province is slow and even drops in current years. More importantly, the growth of inward FDI in Guangdong province still keeps declining while the growth of inward

< Figure 2.2.2 >. FDI Inflows in Guangdong and Jiangsu Provinces.



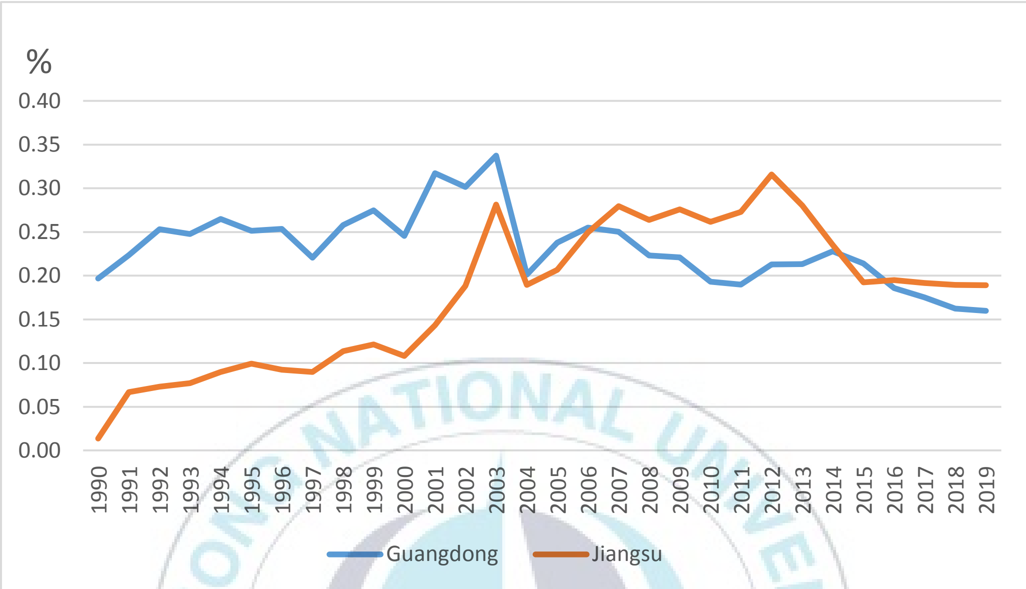
Source: Calculated by the author using data from Guangdong Statistical Yearbook and Jiangsu Statistical Yearbook.

FDI in Jiangsu province appears to raise again after a fall. Consequently, both in terms of the proportion of FDI in China and the growth rate of FDI, Jiangsu province is higher than Guangdong province.

Guangdong province and Jiangsu province are the major economic provinces that absorb the most FDI in China, whereas, they show the different development trends. Therefore, for better economic development in Guangdong province and Jiangsu province, it is necessary to know what are the determinants of FDI between Guangdong province and Jiangsu province.

According to the < Figure 2.2.3 > illustrates the rate of FDI growth in Guangdong and Jiangsu province. From 1990 to 2003 year, the rate of FDI growth of both provinces had been growing. At first, the rate of FDI growth in Guangdong province was much higher than Jiangsu province until 2003. However, from 2003 to 2004, the rate of FDI growth of both provinces was sudden and sharp dropped, which Guangdong province from 0.34 percent in 2003 to 0.20 percent in 2004, and Jiangsu province from 0.28 percent in 2003 to 0.19 percent in 2004. Furthermore, the rate of FDI growth in Jiangsu province exceeded Guangdong province for the first time in 2007. After that, the rate of FDI growth in Jiangsu province almost keeps surpassing Guangdong province. From 2007 to 2012, the rate of FDI in Jiangsu province presents growing but for Guangdong province shows dropping and its growth are slowly. Since 2012, the rate of FDI growth in both provinces shows a decline. This is in line with < Figure 2.2.2 >.

< Figure 2.2.3 >. FDI Growth in Guangdong and Jiangsu Province by Percent.



Source: Calculated by the author using data from Guangdong Statistical Yearbook, Jiangsu Statistical Yearbook and National Bureau of Statistics.

Chapter 3

Literature Review

3.1 Review of Theoretical Foundation

Regarding the theory of FDI, there are various theories. There are seven main kinds of theories that related to the FDI. The theories are electic praradigm theory, product life-cycle theory, marginal industry expansion theory, Classical location theory, modern location theory, Traditional economic theory and New economic geography theory that are introduced as follows. Those theories are highlight to a firm that motivation to invest abroad.

a). Eclectic Paradigm Theory

The Dunning's eclectic paradigm (Dunning, 1988 and Dunning ,1995) emphasizes three important basic concepts are: (1) ownership advantage, (2) location advantage, and (3) internalization advantage. And it also called the OLI advantage theory, which is the explanation for the location of FDI.

Location advantages that other local countries or regions have their own advantage that can undertake the multinational value added of multinational enterprise. The multinational enterprise will choose and take advantage of the firm they had immobile and enrich natural or created resources.

Internalization advantages that firms can own their core competencies by organizing the creation and exploitation. And it described that a firm will be more likely to engage in foreign production by itself if the internalizing cross-border intermediate product can benefit a lot in the market.

There are four types of motivations for FDI: Resource seeking; Marketing seeking; Efficiency seeking; Strategic asset seeking (Dunning ,1998).

In the OLI model Dunning regard location advantage as the key factor in where the international investment occurs. Due to the ownership advantage and the internalization advantage are given external conditions, the important thing is to have a location advantage that can attracts FDI, such as good geographical location, abundant human resources, and natural resources, larger market capacity, favorable government policy, etc. The investing firm likely to engage their foreign product when there is a significant competitive advantage. In the article "Decisions for International Production" published in 1973, Dunning classified location factors into four categories (1) market factors, including market size, market growth, degree of close contact with customers, and current market layout; (2)) trade barriers, including the level of trade barriers, tariffs' level, and the degree to which local customers prefer domestic products; (3) cost factors, including nearness in transportation costs, supply sources, raw material costs, and labor costs; (4) investment environment, including foreign investment Policies, regulations and political stability.

b). Product Life-Cycle Theory

The product life-cycle theory states the observed pattern of international trade developed by Raymond Vernon (1966) in response to the Heckscher-Ohlin model's failure. The theory implies that the invention of all parts and labor related to the product is in the early in product life-cycle. After the product becomes adopted and use in the world market, the production will gradually move away from the origin's place. In some circumstance, the product becomes the imported item by its invention's original country.

The model is at least at first suitable for cater to high-income groups that apply to labor-saving and capital-using products. And it shows the dynamic comparative advantage. A product with comparative advantage in the production in the country has changed from developed countries to developing countries.

The product cycle has three different stages are:

(1) Product innovation stage: new products are produced in innovative companies in developed countries, and the production is generally concentrated in the country. At this time the product had not yet been standardized and the products need to be continuously improved in the design to suit the needs and preference of consumers. At this stage, because the innovative companies have technological monopoly advantages and lack strong competitors, they basically control market share. Therefore, at this stage, the production has not shifted, and international direct investment has not occurred;

(2) Product maturity stage: at this stage, domestic and foreign demand increased, products trended to be standardized, product sales increased, and profit increased rapidly. The cost and the price problem have become more and more significant for the enterprise. At this stage, enterprises mainly make a long-term investment, expand production scale, reduce production costs, and obtain economic benefits of scale. In order to be in an advantageous position in the competition, companies will invest directly in major markets in the world. Therefore, choosing a foreign direct investment that is establishes a subsidiary company abroad for local production and local clearances is the best way to ensure economic benefits.

(3) Product standardization stage: the production technology, scale, and style of products are entirely standardized, which gradually loses the monopolistic position of the original innovator. The basis of competition among enterprises is price and cost. At this time, companies are most concerned about finding low-cost product production locations, so developing countries with low labor costs become the best production locations for companies. The product enters the aging stage in the home country, and its production cycle ends.

c). Marginal Industry Expansion Theory

According to Japan's national conditions, Japanese scholar K. Kojima (1978) elaborated on the theory of marginal industrial expansion, and also named the comparative advantage theory in his masterpiece "Foreign Direct Investment."

The theory of marginal industry expansion believes that foreign direct investment should start from the marginal industry, which is already or about to be at a relatively disadvantaged position in the country, and proceed in sequence. All domestic production activities that have tended to be disadvantaged should be transferred to foreign countries through foreign direct investment. This will make the domestic industrial structure more reasonable and promote the development of domestic foreign trade, and facilitate the adjustment of the host country's industry and promote the labor-intensive industries' development in the host country.

d). Classical Location Theory

The representatives of classical location theory are Duneng and Weber (1826). In the early 19th century, human society was still in the era of the agricultural economy. How to choose the place of farming activities was the main problem faced by society. Therefore, Duneng (1826) proposed the agricultural location theory. Duneng (1826) studied the influence of transportation distance and cost on the spatial distribution of agriculture and proposed the famous "Duneng ring" theory. After entering the beginning of the industrial economy era, the location of industrial production activities mainly depends on the size of production costs, and freight has become an essential factor affecting space costs. Therefore, Weber proposed an industrial location theory based on the pursuit of prices, which is mainly based on minimizing freight costs. Based on the previous research Weber expanded the connotation of location theory and put forward to the first time the concept of location factor and location factor system. The location factor system is mainly composed of transportation cost factors, labor cost factors, and agglomeration factors. Weber believes that freight, wages, and agglomeration will all have an impact on production costs. The central idea of classical location theory is that manufacturers must follow the principle of minimizing production costs when selecting locations.

e). Modern Location Theory

Although Weber's industrial location theory has had a massive impact on the research of western location theory, it also has certain flaws, so later scholars further supplemented, revised, and developed Weber's theory. On the basis of classical location theory, cost school and market school theories appeared.

The cost school has traditionally regarded cost minimization as an essential criterion for foreign direct investment location selection. However, in the meanwhile, it has also expanded the scope of costs and increased transaction costs and information costs to analyze the location selection of foreign direct investment. And pointed out that the location of international investment is tightly related to the size of transaction costs. Caves believe that foreign-invested companies generally face higher search costs than local companies, such as identifying local market potentials and risks and seeking local production inputs. The generation of search costs will prompt multinational companies to avoid investment risks and choose locations with lower transaction costs and information costs. Therefore, the level of information costs also affects the area of foreign direct investment. The guiding ideology of cost minimization in the cost school has had a deep impact on the location selection of multinational companies. The cost factor is always a significant factor in the location selection of international companies.

Since science and technology developing rapidly and the tremendous changes in transportation and communication tools, transportation costs are no longer the primary factor considered when selecting locations for multinational companies. Instead, product sales markets have received more and more attention. The previous classical location selection theory did not believe the effect of the market on location selection. The Germany scholars Kristall (1933) and Resch (1940) supplemented the classical location theory, proposed the importance of the market to location selection, and created and developed the market school.

The market school introduces market factors into the analysis of location selection. It proposes that market and profit maximization are the general principles and ultimate goals of the enterprise's production layout. Multinational companies are more likely to choose the large market size and huge market potential when making a heterogeneous direct investment.

Therefore, foreign-funded companies will try to get close to the market to reduce transportation costs and information search costs. Resch (1940) not only supplemented the location theory, but also expanded the connotation of location factors, adding natural, economic, human, political and other factors. Among them, biological factors refer to natural resources, climate, and traffic conditions, economic factors refer to regional price differences, market supply, and demand, and technological progress, human factors include individual business owners and general national characteristics. And political factors include tariffs and political systems as well as ethnic languages, other factors include trade barriers, consumer preferences, business risks, and administrative procedures. The guiding ideology of proactive approach to the market contained in the market school is very consistent with market strategic multinational companies. Thus, it has significant guiding significance for the location selection of foreign direct investment.

f). Traditional Economic Theory

A traditional economy (Amadeo and Boyle, 2020) is a system that relies on custom, history, and time-honored beliefs. Tradition leads to economic resolutions such as production and distribution. Traditional financial societies were relied on agriculture, fishing, hunting, gathering, or some association of them. They use barter replace for money.

Most traditional economies run in developing countries and emerging markets. They are often happened at such as Latin America and Africa etc. They also can find pockets of traditional economies scattered even in developing countries throughout the world.

Economists and anthropologists consider the traditional economies is the first start for all other economics. Thus, they expect remaining traditional economies to evolve into market, command, or mixed economies over time. The market economy is a system where the rules of supply and demand guide the goods and services production. A central government the makes all economic decisions is called a command economy. A mixed economy combines the characteristics of the other three.

g). New Economic Geography Theory

Economic geography is the study for economic activity, and it is the sub-field of human geography. It can also be regarded as a sub-field or way in economics (Clark; Feldman and Gertle, 2000).

Economists like Paul Krugman and Jeffrey Sachs have also explained many characteristics which have correlated with economic geography. Krugman named his application of spatial thought to the "new economic geography" for the international trade theory, which directly matches with a way within the subject of geography that is also named the "new economic geography" (Durlauf and Blume, 2008). Someone suggested using the name of geographical economics as an alternative (Brakman; Garretsen and Marrewijik, 2001).

Economic geography is sometimes regarded as a branch of human geography, and its focus is on the regional system of human economic activity. Different research methods of human economic activities can be organized around time and space analysis, production or consumption analysis of economic projects, and economic flow analysis. The space-time system analyzed includes regional economic activities, mixed social spaces, and development.

Alternatively, the analysis can focus on the production, exchange, distribution, and consumption of economic activity items. In order to alter the parameters of time and space and goods, geographers can also examine material flows, commodity flows, population flows, and information flows from not the same section of the economic activity system. The analysis of production and flow, industrial areas, rural and urban residential districts, transportation stations, commercial service facilities, and financial and other economic centers are linked into an economic activity system.

3.2. The Eclectic Paradigm Theory

According to the above seven theories, the eclectic paradigm theory is the foundation that applied to our study. There are two reasons, one of the reasons is why we adopt the eclectic paradigm theory and the other reason is to elaborate the disadvantages of six theories why we are did not utilized them that are explained as follows:

The first one is the reason why we adopt the eclectic paradigm theory in our study. For the eclectic paradigm theory indicated that the determinants of FDI are OLI model. And the L (Location advantage) factor is the crucial point for the international investment. Which involves market factors, cost factors, trade barriers, and investment environment. In our studies, Guangdong province and Jiangsu province are the parts of China. They are absorbing inward FDI are mainly for the location factors, because the O (ownership advantage) and I (internalization advantage) are the external conditions for the company. Therefore, for the FDI in those two provinces location factor is more suitable for attracting FDI.

The second one is the disadvantages of the six theories which do not include the eclectic paradigm theory. About the Product life-cycle theory, it elaborates that the product has three stages then transform to international investment. The three stages are the product innovation stage, product maturity stage, and product standardization stage. In the product standardization stages, the enterprise will look for the low labor cost in the developing country which occur the foreign investment. For Guangdong and Jiangsu province of China attract the FDI are not only labor cost factor, but that's also we do not adopt it.

The marginal industry expansion theory states the international investment due to the marginal industry which the industry already or about to be a relative disadvantage position in a country. Therefore, this theory does not apply to our studies.

The classical location theory is first at all applies to the agriculture economy and then developed into industry economy. When selecting the location must minimize production cost. This theory believes the transportation cost factors, labor cost factors, and agglomeration factors impacted the production cost. This theory is the principle of cost minimization and ignores some other factors such as market, so we are not use it in our studies.

The modern location theory is divided in to cost school and market school theories and that developed were based on the classical location theory. In this theory consider the foreign investment are dependent on cost factors and market factors. Compare to the eclectic paradigm theory, the factors for the determinant of international investment are incomplete.

In traditional economic theory, people think it is the first start for all other economic. It is a system that relies on custom, history, and time-honored beliefs.

Societies with traditional economies relied on agriculture, fishing, hunting, gathering, or some association. They use barter replace for money. Obviously, this theory is not suitable for nowadays society of international investment.

New economic geography theory is focused on the regional system of human economic activity. Around time-space analyzed that FDI is determined by production factor, exchange factor, distribution factor, and consumption factors. This theory ignores the existence of international trade.

3.3. Review of Previous Studies

The determinants of inward FDI in Guangdong and Jiangsu province are in terms of the related existing literature. The following < Table. 3.3.1 > is the summarizes of the studies for the determinant of inward FDI to the different provinces in China.

< Table 3.3.1 >. Study on Determinants of Inward FDI in Different Province in China.

No.	Author	Case study	Methodology	Findings
1	Li and Li (2006)	Jiangsu province (1992-2003)	OLS model	Opening up (+); Labor quality (-); labor cost (-); Infrastructure (+).
2	Jia and Kim (2008)	Shandong province (2000-2005)	Fixed effect model	Market size (+); Education (+); Labor cost (+); Raw material price (-); Policy (+).

3	Gong and Zhou (2008)	Chongqing (1987-2006)	ARDL model	Labor cost (-); Trade openness (+); Cumulative FDI (+).
4	Fu *et al.* (2009)	Hebei province (1990-2008)	OLS model	PAI (+); Labor cast (-); Infrastructure (+); Personal saving (+).
5	Li *et al.* (2010)	Liaoning province (1990-2008)	OLS model	GDP per capita (+); Labor cost (-); Cumulative FDI (+).
6	Wang (2010)	Hubei province (1986-2009)	OLS model	Labor cost (-); GDP (+); Opening up (+); Infrastructure (-); Quality of workforce (+); Financial environment (+).
7	Wang (2011)	Shanxi province (1995-2008)	OLS model	Infrastructure (+); Urbanization (+); GDP per capita (-); Opening up (-).
8	Shi (2011)	Jiangsu province (2008; 13Cities)	OLS model	Labor quality (+); Agglomeration factors (+); Policy factors (+).
9	Ma *et al.* (2011)	Zhejiang Province (2009)	OLS model	Agglomeration (+); Market size (+); Infrastructure (+); Labor cost (-).

10	Guo and Shu (2012)	Guangdong province (1991-2010)	OLS model	Labor cost (-); Number of industrial enterprises above designated size (+); Market opening up (+); Cumulative FDI (+).
11	Xu and Yeh (2013)	Guangdong province (Guangzhou & Dongguan city)	OLS model	Guangzhou: Market potential (+); Labor cost (-). Dongguan: Agglomeration (+).
12	Li and Lu (2013)	Guangxi province (1983-2011)	ARDL model	Agglomeration effect (+); Labor cost (-); Trade openness (+)
13	Li *et al.* (2014)	Shanghai (236 companies of Korea)	OLS model	Incentive (+); Opening up (+).
14	Huang and Wei (2015)	Hainan province (1988-2012)	OLS model	GDP per capita (+); Human capital (+); Opening up (+); Industry structure of tertiary (-).
15	Chad *et al.* (2015)	Liaoning province (2000-2010)	Random effects model	Population density (+); Unemployment (+); Real estate employment (+); TCT employment (+); Science and technology employment (+); Personal income tax (+); Debt

				(+).
16	Xia and Song (2015)	31 Province (1985-2012)	OLS model	East region: GDP (+); Export (+); Labor cost (-); The proportion of second industry (+). Central region: GDP (+); Labor cost (-). Western Region: GDP (+); The proportion of second industry (+); Labor cost (-)
17	Fu (2016)	Shandong province (1985-2014)	OLS model	Labor cost (-); GDP (+); Medical institution (+); Labor quality (+)
18	Dai (2016)	9 provinces (2006-2015)	Data Envelopment Analysis (DEA) model	Comprehensive efficiency: Shanghai, Jiangsu and Heilongjiang; Technical efficiency: Shanghai, Beijing and Zhejiang; Scale efficiency: Shandong, Zhejiang and Guangdong.
19	Zeng *et al.* (2017)	Sichuan Province (2001-2015)	OLS model	Market size (+); Labor quality (+); Labor cost (-);

				Agglomeration (+).
20	Guo and Xing (2019)	Henan Province (1986-2016)	Cointegration analysis and error correction (VEC) model	Labor cost (-); opening up (-); GDP (+); Market size (+); Infrastructure (+); Industrial structure (-).

The cost efficiency variables usually are replaced with labor cost. In Fu (2016) findings that the labor cost increase by 1 percent, the FDI inflow to Shandong province reduces by 2.62 percent by using the OLS method. In the study of Sichuan province, Zeng and Zheng (2017) adopted the OLS approach also and found out that 1 percent improve in labor cost, the inward FDI decreases by 32.70 percent. The significant coefficient result of labor cost for Sichuan province implies that FDI thinks a great deal of cost efficiency in Sichuan province. From the empirical result of the quasi-maximum likelihood (QML) method, lower growth rate of labor cost can attract more FDI in China by Lei *et al.* (2018). According to the previous studies, many researchers discover that cost efficiency has a negative relationship with FDI, such as Xia and Song (2015) and so on. Nonetheless, Huang and Wei (2015) demonstrate that the relationship between labor cost and FDI is insignificance by utilizing the Multiple Regression Model for empirical analysis in Hainan province.

For the market seeking variable, the per capita gross domestic product (PGDP) or gross domestic product (GDP) is often instead of it. Regards the per capita GDP, Li and Chen (2010), who also applied the OLS approach in their empirical study to obtained that per capita GDP promotes by 1 percent, the inward FDI will be stimulated by 2.42 percent in their study of Liaoning province. Concerning GDP, from the empirical test results that Guo and Xing (2019) state the GDP enhance by 1 percent, the FDI into Henan province advance by 0.45 percent with cointegration analysis and error correction (VEC) technology to explore. On the contrary, the relationship between per capita GDP and FDI appear negative when Wang (2011) investigated the determinants of inward FDI in Shanxi province. The results presented a 1 percent increase in per capita GPD in Shanxi province, the inward FDI decrease by 1.59 percent. Moreover, Guo and Shu (2012) discover that the GDP shows no impact on FDI inflow to Guangdong province by employing the OLS method. Gopalan *et al.* (2019) indicated higher per capita GDP implies greater consumer demand that is readily attracts more greenfield FDI inflows into China. And the consequence of empirical proved that the per capita GDP and FDI inflows have a positive correlation by adopting the fixed effects model.

For the resource seeking variable, Jiang *et al.* (2017) replace it with infrastructure. Adopting the methodology of the OLS model, Fu (2009) studied the determinants of FDI in Hebei province and took the infrastructure as a variable in the empirical tests. The result illustrates that infrastructure and FDI has positive relationship with a 1 percent increase in infrastructure, the FDI into Hebei province improves by 1.27 percent. However, Wang (2010) used the OLS method in the empirical test study and the finding demonstrates that the infrastructure and FDI have a negative relationship that the infrastructure increases by 1 percent, the FDI inflow to Hubei province reduce by 0.07 percent.

For the high-tech labor seeking, usually the education of the human capital or labor quality to replace of it. Chad *et al.* (2015) applied the random effect method to obtain the results that the 1 percent improve in human capital, the inward FDI promote by 6.64 percent in Liaoning province. In the study of Korea's direct investment to Shandong province, Jia and Kim (2008) used the fixed effect approach to find out that the human capital boosts by 1 percent, the direct investment of Korea to Shandong province promotes by 1.44 percent.

In the economic activity general, the level of market opening variable use the trade openness to proxied by it. Li and Lu (2013), in their findings, declares that the trade openness boosts in 1 percent, the inward FDI to Guangxi province improves by 0.75 percent though ARDL method in their empirical tests. Gong and Zhou (2008) study the determinants of FDI in Chongqing discovered that 1 percent rise in trade openness, the inward FDI to Chongqing elevates 1 percent by using the ARDL method. This is in line with Li *et al.* (2014) by employing the regression model to obtain the outcome that the trade openness and FDI has a positive relationship in Shanghai.

About the economic structure variable, according to Guo and Shu (2012), they utilized the tertiary industry as a variable and in their empirical study know that the tertiary industry has no influence on attracting FDI inflow to Guangdong province. Furthermore, Huang and Wei (2015) discovered that the tertiary industry rises by 1 percent, and inward FDI is reduced by 1.55 percent in Hainan province.

In accordance with the above literature reviews, some papers that studied the location determinants of FDI also use the eclectic paradigm theory. Thus, we adopt the eclectic paradigm theory as a general theoretical foundation in our study. This is because the eclectic paradigm theory offers a conceptual framework that generally clarifies the localization of FDI.

In terms of OLI advantage theory, as the O (ownership) advantage and the I (internalization) advantage are given external conditions, on the basis of the above literature reviews, we concentrate on L (location) advantage, which can be classified into average wage, infrastructure, education, trade openness, per capita GDP and tertiary industry in our study.

Regarding the methodology of empirical tests, most of the studies applied the time series data and adopted the OLS model technique to do the estimates. Using the ARDL model with time-series data is scarcity. There are only two papers shows Gong and Zhou (2008) utilizing the time series data (1987-2006) and Li and Lu (2013) applied the time series data (1983-2011) with adopting the ARDL model technique in the estimations. As the small number of observations, the ARDL model is more reliable because of the estimates with long run coefficient and short run coefficient. And this is more robust and performs better for the small sample size of data.

Fourth, to summaries from the literature that even though Guangdong province and Jiangsu province are the top one and top two destinations of foreign direct investment, respectively, but there are only two papers for each province about the determinants of foreign direct investment in Guangdong and Jiangsu province. Thus, studies for the determinants of FDI of Guangdong province and Jiangsu province are scarcity. In addition, from the previous studies of Guangdong province in 2012 and 2013, Guo and Shu (2012) studied the Guangdong province which data period is 1991-2010, and Xu and Yeh (2013) only focused on two cities (Guangzhou and Dongguan) for research which ignored another important cite such as Shenzhen and Zhuhai, etc. Both papers are too old and cannot explain the current FDI of Guangdong province drop. For the previous studies of Jiangsu province in 2006 and 2011. Li and Li (2006) study the Jiangsu province, which data period 1992-2003 and Shi (2011) data only for 2008. Both papers also too old and cannot explain the current FDI of Jiangsu province drop. Therefore, our study will be the newest contribution for Guangdong province and Jiangsu province in China.

Furthermore, based on the previous studies on Guangdong province and Jiangsu province, the methodology they used is the OLS model and with the small number of observations. However, we apply the ARDL model that is more reliable than the OLS model despite the small data size in our study. In the next chapter, we will discuss the details of the research methodology.

Chapter 4

Theory and Methodology

4.1. Theoretical Framework

The aim of our study is to investigate the determinants of FDI in Guangdong and Jiangsu provinces in China from 1985-2019. We adopt the eclectic paradigm theory, which usually gives explanatory notes for the location of FDI. Location advantage regards as a critical factor in where international investment occurs. The Auto-Regressive Distributed Lag (ARDL) model will be applied in our empirical analysis, which implemented with E-Views (version 10) to estimate the long run co-integration relationship of variances and obtain the Error Correction model (ECM) in order to determine the short run relationship.

The Dunning's eclectic paradigm (Dunning, 1988 and Dunning ,1995) emphasizes three important basic concepts are: (1) ownership advantage, (2) location advantage, and (3) internalization advantage. And it is also called the OLI advantage theory, which is the explanation for FDI's location.

In the OLI model, Dunning regard location advantage as the critical factor in where the international investment occurs. Due to the ownership advantage and the internalization advantage are given external conditions, the important thing is to have a location advantage that can attracts FDI, such as good geographical location, abundant human resources, and natural resources, larger market capacity, favorable government policies, etc. The investing firm was likely to engage their foreign product when there is a significant competitive advantage. In the article "Decisions for International Production" published in 1973, Dunning classified location factors into four categories (1) market factors, including market size, market growth, degree of close contact with customers, and current market layout; (2)) trade barriers, including the level of trade barriers, tariffs' level, and the degree to which local customers prefer domestic products; (3) cost factors, including nearness in transportation costs, supply sources, raw material costs, and labor costs; (4) investment environment, including foreign investment Policies, regulations and political stability.

Therefore, we concentrate on the location advantage. They are location-specific that possibly have impact on the firms which pay attention to the cost efficient, market seeking and resource seeking by Hou *et al.* (2018) and Gopalan *et al.* (2019) and Jiang *et al.* (2017), respectively. According to the literature review, the variables in our study could be classified using various factors such as average wage, infrastructure, education, trade openness, per capital GDP, and tertiary industry.

Average wage: Fu *et al.* (2016) indicated that labor cost has a relevant effect on FDI and has a negative effect on FDI attraction. Labor cost is one of the decisive factors for MNEs by Fu (2016). This is because cheaper labor can narrow down the production cost of a company and increase its profits. Thence, the labor cost has a negative correlation with FDI that are expected.

Infrastructure: on the basis of literature reviews, Wang (2011) and Wang (2010) applied the infrastructure regard as one of the variables in the research and stated that the economic development's scale influences the FDI. A higher level of infrastructure can increase the scale and efficiency of social production and reduce transportation costs. Therefore, the relationship between infrastructure and FDI is considered to be positive.

Education: Chad *et al.* (2015) have illustrated high-quality employment has significant and positive for FDI. Additionally, Shi (2010) explained the factors of labor quality have an essential influence on FDI location selection and will increase. When the reform and opening-up was at the beginning, the FDI of China was mainly labor-intensive enterprises, and sufficient cheap labor was the main factor considered when foreign investment. These low-processing projects did not have high requirements on the quality of labor. With the continuous economic development of China, foreign investment is shifting from low-processing and labor-intensive to technology-intensive. Capital, as well as capital and technology-intensive enterprise groups, need to be combined with high-quality human capital. Hence, education and FDI are expected to be positive.

Trade openness: Guo and Shu (2012) and Li and Lu (2013) clarified that opening to the external world also has a greater effect on attracting foreign direct investment and has a positive correlation. On account of regions with a high level of opening to the external world will narrow the gap between their economic management level and international management level, which can provide reliable and effective sales channels for products produced by MNEs to foreign countries, and they can also quickly introduce foreign advanced technology and equipment. Hence, it is expected that there is a positive correlation between trade openness and FDI.

Per capita GDP: Li and Chen (2010) stated that the measure of foreign direct investment will be greater while the faster the economy grows. The reason is since follows that per capita GDP is the mirror for a region or country's level of economic development. The development of economic level determines the potential purchasing power of the region's market. A higher level of economic development represents a higher level of consumption and a power consumption capacity. Which has an extremely attraction for the market-seeking MNEs. Therefore, per capita GDP and FDI have a position connection.

Tertiary industry: based on the literature reviews, Huang and Wei (2015) elaborated that generally, the foreign enterprise pays more attention to investment in manufacturing and service industries rather than first and secondary which can benefit more profits. The tertiary industry and FDI have a positive correlation due to the development of the tertiary industry can provide service facilities and good conditions for foreign direct investment. Therefore, the tertiary industry and FDI are expected to be a positive relationship.

On the basis of the above framework, the specification for the determinant of inward FDI can be present an equation form as follows:

$$\begin{aligned} \ln FDI_t = \beta_0 + \beta_1 \ln WAGE_t + \beta_2 \ln IFS_t + \beta_3 \ln EDU_t + \\ \beta_4 \ln OPEN_t + \beta_5 \ln PGDP_t + \beta_6 \ln TER_t + \varepsilon_t \end{aligned} \quad (1)$$

Where Ln represents for natural logarithm and the variables WAGE, IFS, EDU, OPEN, PGDP, and TER are represented for average wage, infrastructure, education, trade openness, per capita GDP, and tertiary industry, respectively. The Ɛ is an error term. For briefness, let lowercase represent the logarithmic form of 6 variables in uppercase and dependent variable fdi_t represent for $\ln FDI_t$. Accordingly, equation (1) is transformed in the equation (2) as below:

$$\mathrm{fdi}_t = \beta_0 + \beta_1 \mathrm{wage}_t + \beta_2 ifs_t + \beta_3 edu_t + \beta_4 open_t + \beta_5 pgdp_t + \beta_6 ter_t + \varepsilon_t \quad (2)$$

Based on the above discussions, the β_1 is expected to be negative and the β_2, β_3, β_4, β_5 and β_6 are expected to be positive.

4.2. Model Specification

Under the equation (2) which is externalize in the theoretical framework, the objective is to present an adequate empirical model to investigate the nexus between the variables of Guangdong and Jiangsu province in China and inward FDI in this section. The Auto-regressive Distributed Lag (ARDL) model is exploited in our empirical model. Furthermore, we are utilizing the Toda-Yamamoto method to carry out the Granger causality the among studied variables.

4.2.1 The Auto-Regressive Distributed Lag Model

The first advantage for the methodology of ARDL is which can offer equitable result even though there are only have a small number of samples in the study. The Johansen approach of co-integration is not effective if the observation is small by Toda. We have small observations due to the limitation of getting a larger size of data in our study. Therefore, we use the ARDL model to discover the co-integration among the variables we studied or the bounds testing co-integration method of Pesaran *et al.* (2001). The ARDL model's second advantage is that it can be adopted to detect for the co-integration and execute empirical estimation simultaneously. The third advantage of the ARDL model is that the tests of bounds are applicable regardless of the level of variable co-integration, if the regressors are exclusively co-integrated of I(0) or

I(1) or reciprocal co-integration. Lastly, this approach affords to derive the coefficient of long run and short run by adopting the Error Correction Method (ECM) in our study. The Error Correction Method (ECM), which consist of the ARDL technique in our study, is presented as follow:

$$\Delta \mathrm{fdi}_t = \alpha + \sum_{i=1}^{a} \beta_i \Delta fdi_{t-1} + \sum_{i=1}^{b} \gamma_i \Delta wage_{t-1} + \sum_{i=1}^{c} \delta_i \Delta ifs_{t-1} + \sum_{i=1}^{d} \eta_i \Delta edu_{t-1}$$

$$+ \sum_{i=1}^{e} \varsigma_i \Delta open_{t-1} + \sum_{i=1}^{f} \kappa_i \Delta pgdp_{t-1} + \sum_{i=1}^{g} \phi_i \Delta ter_{t-1} + \lambda fdi_{t-1} + \theta wage_{t-i} \quad (3)$$

$$+ \mu ifs_{t-1} + \pi edu_{t-1} + \psi open_{t-1} + \omega pgdp_{t-1} + \chi ter_{t-1} + \varepsilon_{t-1}$$

Where $\lambda, \phi, \mu, \pi, \psi, \omega$ and χ are long run multipliers and Δ is stands for the first difference operator. Furthermore, the parameters a, b, c, d, e, f and g are the optimal lag lengths which were picked according to the minimum Akaike Information Criterion (AIC).

On the basis of the ARDL bounds testing method, to estimate the equation (3) that with the F-test can be detected whether among the variables of long run relationship are existence or not. The aims of that are to exam the joint significance of the lagged level of regressors of model. The null hypothesis that we tested is *Ho* : $\lambda = \phi = \mu = \pi = \psi = \omega = \chi = 0$ against the alternative hypothesis *H1*: $\lambda \neq 0$, or $\phi \neq 0, or \mu \neq 0, or \pi \neq 0, or \psi \neq 0, or \omega \neq 0, or \chi \neq 0.$

4.2.2. The Long Run and Short Run Coefficients

The purpose of adjusted equation (3) is to establish the long-run relationship to discover the relationship between variables and FDI of Guangdong and Jiangsu province, respectively. The solution of equation (3) with simplify form that can derive conditional long run ARDL model, when the first difference of variables are together equal zero (Δfdi = Δwage = Δifs = Δedu = Δopen = Δpgdp = Δthr). Therefore,

$$\text{fdi}_t = \Omega_0 + \Omega_1 wage + \Omega_2 ifs + \Omega_3 edu + \Omega_4 open + \Omega_5 pgdp + \Omega_6 ter + \nu_t \qquad (4)$$

where,

$$\Omega_0 = \text{-}\alpha/\lambda,\ \Omega_1 = \text{-}\theta/\lambda,\ \Omega_2 = \text{-}\mu/\lambda,\ \Omega_3 = \text{-}\pi/\lambda,\ \Omega_4 = \text{-}\psi/\lambda,\ \Omega_5 = \text{-}\omega/\lambda,\ \Omega_6 = \text{-}\chi/\lambda$$

and ν_t is an error term.

The dynamic parameters of short run and the error correction denotation (speed of adjustment) that are received by the Error Correction Model (ECM) related to the long run estimates of equation (4). To demonstrate the long run relation among variables, The ECM is used as the sign of Error Correction Term (ECT). Thus, a negative sign of shows the convergence of the ETC and a positive sign shows the diversity is to find out the long run relationship. A negative ECT sign is essential as it points out the long run relationship among variables are significant. It is expressed as follow:

$$\begin{aligned}\Delta\text{fdi}_t = \alpha &+ \sum_{i=1}^{a} \beta_i \Delta fdi_{t-1} + \sum_{i=1}^{b} \gamma_i \Delta wage_{t-1} + \sum_{i=1}^{c} \delta_i \Delta ifs_{t-1} + \sum_{i=1}^{d} \eta_i \Delta edu_{t-1} \\ &+ \sum_{i=1}^{e} \zeta_i \Delta open_{t-1} + \sum_{i=1}^{f} \kappa_i \Delta pgdp_{t-1} + \sum_{i=1}^{g} \phi_i \Delta \text{ter}_{t-1} + \varphi ECM_{t-1} + \varepsilon_t\end{aligned} \qquad (5)$$

Where $ECM_{\text{t-1}}$ is one-period lagged for Error Correction Term which gained from equation (4). $\beta_i, \gamma_i, \delta_i, \eta_i, \varsigma_i, \kappa_i, \varphi_i$ are the dynamic coefficient of the short run in the model and φ represent the adjustment speed of astringent to the equilibrium of long run.

To accomplish the co-integration of the ARDL bounds test, the diagnostic and stability tests have to be executed to evaluate the ARDL model's goodness of fit in our study. The diagnostic test inspects the practical form, standard form, serial connection, and heteroskedacity related to the model. In our study, we adopt the Breuch-Godfrey serial correlation LM test and reset evaluation test of Ramsey. The cumulative sum of recursive residuals (CUSUM), and the cumulative sum of the square of recursive residual (CUSMSQ) was used to evaluate the stability of the ARDL model which utilized in our estimation.

4.2.3. The Toda-Yamamoto Method to Granger Causality Test

The ARDL model test does not demonstrate the orientation of the causal relationship among variables. In contrast, its test illustrates the relationship between long run and short run variables. Therefore, when complete the test of diagnostic and stability, it is essential to advance the causality test, which the causal relationship among the variables to be evaluated. The Toda-Yamamoto approach to Granger Causality was adopted in our study.

Toda-Yamamoto approach to Granger Causality was adopted in our study. The Toda-Yamamoto Granger Causality approach employ an amended Wald test for restriction on each coefficient with the Vector Auto Regression VAR (k), where (k) is the lag length. The real correct order of the system (k) is replenished by the maximal order of integration ($d_{\max}$). Then the VAR (k+ $d_{\max}$) is estimated with the last lagged $d_{\max}$ vector which being ignored coefficient. The Wald statistic applies a Chi-square allocation of a function that with degrees of freedom match to the number of removed lagged variables. Follows the Vector Autoregressive (VAR) system our empirical model that conducted by Toda-Yamamoto approach to Granger causality test is present as below:

$$
\begin{aligned}
\mathrm{fdi}_t = \alpha_0 &+ \sum_{i=1}^{k} \alpha_{1i} fdi_{t-i} + \sum_{j=k+1}^{d\max} \alpha_{2j} fdi_{t-j} + \sum_{i=1}^{k} \beta_{1i} wage_{t-i} + \sum_{j=k+1}^{d\max} \beta_{2j} wage_{t-j} \\
&+ \sum_{i=1}^{k} \gamma_{1i} ifs_{t-i} + \sum_{j=k+1}^{d\max} \gamma_{2j} ifs_{t-j} + \sum_{i=1}^{k} \delta_{1i} edu_{t-i} + \sum_{j=k+1}^{d\max} \delta_{2j} edu_{t-j} \\
&+ \sum_{i=1}^{k} o_{1i} open_{t-i} + \sum_{j=k+1}^{d\max} o_{2j} open_{t-j} + \sum_{i=1}^{k} \varsigma_{1i} pgdp_{t-i} + \sum_{j=k+1}^{d\max} \varsigma_{2j} pgdp_{t-j} \\
&+ \sum_{i=1}^{k} \eta_{1i} ter_{t-i} + \sum_{j=k+1}^{d\max} \eta_{2j} ter_{t-j} + \mathrm{u}_{1t}
\end{aligned} \tag{6}
$$

$$
\begin{aligned}
\mathrm{wage}_t = \theta_o &+ \sum_{i=1}^{k} \theta_{1i} wage_{t-i} + \sum_{j=k+1}^{d\max} \theta_{2j} wage_{t-j} + \sum_{i=1}^{k} \iota_{1i} fdi_{t-i} + \sum_{j=k+1}^{d\max} \iota_{2j} fdi_{t-j} \\
&+ \sum_{i=1}^{k} \kappa_{1i} ifs_{t-i} + \sum_{j=k+1}^{d\max} \kappa_{2j} ifs_{t-j} + \sum_{i=1}^{k} \lambda_{1i} edu_{t-i} + \sum_{j=k+1}^{d\max} \lambda_{2j} edu_{t-j} \\
&+ \sum_{i=1}^{k} \mu_{1i} open_{t-i} + \sum_{j=k+1}^{d\max} \mu_{2j} open_{t-j} + \sum_{i=1}^{k} \nu_{1i} pgdp_{t-i} + \sum_{j=k+1}^{d\max} \upsilon_{2j} pgdp_{t-j} \\
&+ \sum_{i=1}^{k} \xi_{1i} ter_{t-i} + \sum_{j=k+1}^{d\max} \xi_{2j} ter_{t-j} + \mathrm{u}_{2t}
\end{aligned} \tag{7}
$$

$$\begin{aligned}\inf_t &= \pi_o + \sum_{i=1}^{k} \pi_{1i} ifs_{t-i} + \sum_{j=k+1}^{d\max} \pi_{2j} ifs_{t-j} + \sum_{i=1}^{k} \rho_{1i} fdi_{t-i} + \sum_{j=k+1}^{d\max} \rho_{2j} fdi_{t-j} \\ &+ \sum_{i=1}^{k} \sigma_{1i} wage_{t-i} + \sum_{j=k+1}^{d\max} \sigma_{2j} wage_{t-j} + \sum_{i=1}^{k} \tau_{1i} edu_{t-i} + \sum_{j=k+1}^{d\max} \tau_{2j} edu_{t-j} \\ &+ \sum_{i=1}^{k} \nu_{1i} open_{t-i} + \sum_{j=k+1}^{d\max} \nu_{2j} open_{t-j} + \sum_{i=1}^{k} \phi_{1i} pgdp_{t-i} + \sum_{j=k+1}^{d\max} \phi_{2j} pgdp_{t-j} \\ &+ \sum_{i=1}^{k} \chi_{1i} ter_{t-i} + \sum_{j=k+1}^{d\max} \chi_{2j} ter_{t-j} + u_{3t}\end{aligned} \tag{8}$$

$$\begin{aligned}\mathrm{edu}_t &= \varphi_0 + \sum_{i=1}^{k} \varphi_{1i} edu_{t-i} + \sum_{j=k+1}^{d\max} \varphi_{2j} edu_{t-j} + \sum_{i=1}^{k} \omega_{1i} fdi_{t-i} + \sum_{j=k+1}^{d\max} \omega_{2j} fdi_{t-j} \\ &+ \sum_{i=1}^{k} \vartheta_{1i} wage_{t-i} + \sum_{j=k+1}^{d\max} \vartheta_{2j} wage_{t-j} + \sum_{i=1}^{k} \varpi_{1i} ifs_{t-i} + \sum_{j=k+1}^{d\max} \varpi_{2j} ifs_{t-j} \\ &+ \sum_{i=1}^{k} \Gamma_{1i} open_{t-i} + \sum_{j=k+1}^{d\max} \Gamma_{2j} open_{t-j} + \sum_{i=1}^{k} \mathrm{E}_{1i} pgdp_{t-i} + \sum_{j=k+1}^{d\max} \mathrm{E}_{2j} pgdp_{t-j} \\ &+ \sum_{i=1}^{k} \mathrm{Z}_{1i} ter_{t-i} + \sum_{j=k+1}^{d\max} \mathrm{Z}_{2j} \mathrm{ter}_{t-j} + \mathrm{u}_{4t}\end{aligned} \tag{9}$$

$$\begin{aligned}\mathrm{open}_t &= \Theta_0 + \sum_{i=1}^{k} \Theta_{1i} open_{t-i} + \sum_{j=k+1}^{d\max} \Theta open_{t-j} + \sum_{i=1}^{k} \mathrm{H}_{1i} fdi_{t-i} + \sum_{j=k+1}^{d\max} \mathrm{H}_{2j} fdi_{t-j} \\ &+ \sum_{i=1}^{k} \mathrm{I}_{1i} wage_{t-i} + \sum_{j=k+1}^{d\max} \mathrm{I}_{2j} wage_{t-j} + \sum_{i=1}^{k} \mathrm{K}_{1i} ifs_{t-i} + \sum_{j=k+1}^{d\max} \kappa_{2j} ifs_{t-j} \\ &+ \sum_{i=1}^{k} \Lambda_{1i} edu_{t-i} + \sum_{j=k+1}^{d\max} \Lambda_{2j} edu_{t-j} + \sum_{i=1}^{k} \mathrm{M}_{1i} pgdp_{t-i} + \sum_{j=k+1}^{d\max} \mathrm{M}_{2j} pgdp_{t-j} \\ &+ \sum_{i=1}^{k} \mathrm{N}_{1i} ter_{t-i} + \sum_{j=k+1}^{d\max} \mathrm{N}_{2j} ter_{t-j} + \mathrm{u}_{5t}\end{aligned} \tag{10}$$

$$\begin{aligned}\mathrm{pgdp}_t = \Pi_0 &+ \sum_{i=1}^{k} \Pi_{1i}\, pgdp_{t-i} + \sum_{j=k+1}^{d\max} \Pi_{2j}\, pgdp_{t-j} + \sum_{i=1}^{k} \mathrm{P}_{1i}\, fdi_{t-i} + \sum_{j=k+1}^{d\max} \mathrm{P}_{2j}\, fdi_{t-j} \\ &+ \sum_{i=1}^{k} \mathrm{T}_{1i} wage_{t-i} + \sum_{j=k+1}^{d\max} \mathrm{T}_{2j} wage_{t-j} + \sum_{i=1}^{k} \Phi_{1i} ifs_{t-i} + \sum_{j=k+1}^{d\max} \Phi_{2j} ifs_{t-j} \\ &+ \sum_{i=1}^{k} \mathrm{X}_{1i} edu_{t-i} + \sum_{j=k+1}^{d\max} \mathrm{X}_{2j} edu_{t-j} + \sum_{i=1}^{k} \Psi_{1i} open_{t-i} + \sum_{j=k+1}^{d\max} \Psi_{2j} open_{t-j} \\ &+ \sum_{i=1}^{k} \Omega_{1i} ter_{t-i} + \sum_{j=k+1}^{d\max} \Omega_{2j} \mathrm{ter}_{t-j} + \mathrm{u}_{6t} \end{aligned} \quad (11)$$

$$\begin{aligned}\mathrm{ter}_t = \aleph_0 &+ \sum_{i=1}^{k} \aleph_{1i} ter_{t-i} + \sum_{j=k+1}^{d\max} \aleph_{2j} ter_{t-j} + \sum_{i=1}^{k} \partial_{1i}\, fdi_{t-i} + \sum_{j=k+1}^{d\max} \partial_{2j}\, fdi_{t-j} \\ &+ \sum_{i=1}^{k} \iota_{1i} wage_{t-i} + \sum_{j=k+1}^{d\max} \iota_{2j} wage_{t-j} + \sum_{i=1}^{k} \int_{1i} if\mathrm{s}_{t-i} + \sum_{j=k+1}^{d\max} \int_{2j} ifs_{t-j} \\ &+ \sum_{i=1}^{k} \Omega_{1i} edu_{t-i} + \sum_{j=k+1}^{d\max} \Omega_{2j} edu_{t-j} + \sum_{i=1}^{k} \ell_{1i} open_{t-i} + \sum_{j=k+1}^{d\max} \ell_{2j} open_{t-j} \\ &+ \sum_{i=1}^{k} \wp_{1i}\, pgdp_{t-i} + \sum_{j=k+1}^{d\max} \wp_{2j}\, pgdp_{t-j} + \mathrm{u}_{7t} \end{aligned} \quad (12)$$

With regard to the equation (6), the Granger causality from $\mathrm{wage}_t, \mathrm{inf}_t, edu_t, open_t, pgdp_t$ and thr_t to fdi_t indicates $\beta_{1i} \neq 0 \text{ or } \gamma_{1i} \neq 0 or \delta_{1i} \neq 0 or\, o_{1i} \neq 0 or \varsigma_{1i} \neq 0 or\, \eta_{1i} \neq 0$, respectively. The same conception is employed to the equation from (7) to (12) for causality from multiple variables to $\mathrm{wage}_t, \mathrm{inf}_t, edu_t, open_t, pgdp_t$ and ter_t, respectively.

4.3. Description of Data and Source

This thesis adopted time series data which selects the relevant annual data of Guangdong and Jiangsu provinces from 1985 to 2019 as samples. These data are derived from Guangdong Statistical Yearbook, and Jiangsu Statistical Yearbook over the years, or calculated based on the relevant data of Guangdong Statistical Yearbook, and Jiangsu Statistical Yearbook. For Guangdong province, we utilize the FDI stock (in ten million US dollars) for inward FDI (*fdi*) as the data of FDI flows are too volatile. The average wage (*wage*) is (in US dollar); The infrastructure (*ifs*) is the freight traffic (in million ton-kilometers). The education (*edu*) is the number of college student (in million population). The trade openness (*open*) is the total export over GDP (in thousand percent). The per capita gross domestic product (*pgdp*) is (in ten yuan). The tertiary industry (*ter*) is (in thousand percent). For Jiangsu province are same as Guangdong province, the FDI stock (in ten million US dollars) for inward FDI (*fdi*) as the data of FDI flows are too volatile. The average wage (*wage*) is (in US dollar); The infrastructure (*ifs*) is the freight traffic (in million ton-kilometers). The education (*edu*) is the number of college student (in million population). The trade openness (*open*) is the total export over GDP (in thousand percent).

< Table 4.3.1 >. The Definition and Source of Variables Data

Variable	Name	Definition	Expectation	Justification	Source
FDI	Stocks of inflow FDI				GD; JS
WAGE	Wage	Average wage	(-)	Lower wage increases the FDI as cheaper labor can reduce the production cost of a company and increase its	GD; JS

				profits.	
IFS	Infrastructure	Freight traffic	(+)	A higher level of infrastructure can increase the scale and efficiency of social production and reduce transportation costs.	GD; JS
EDU	Education	College student	(+)	With the continuous economic development of China, foreign investment is shifting from low-processing and labor-intensive to capital and technology-intensive.	GD; JS
OPEN	Trade openness	The proportion of total exports to GDP	(+)	High level of opening to outside world can provide reliable and effective sales channels for products produced by MNEs to foreign countries, also can quickly introduce foreign advanced technology and equipment.	GD; JS
PGDP	Per capita GDP	Per capita gross domestic product	(+)	Per capita GDP reflects the level of economic development of a country or region, which determines the	GD; JS

				potential purchasing power of the country or region's market.	
TER	Tertiary industry	The proportion of tertiary industry of total GDP	(+)	The development of the tertiary industry can provide service facilities and good conditions for FDI.	GD; JS

Note: GD = Guangdong province; JS = Jiangsu province.

Source: Guangdong Statistical Yearbook and Jiangsu Statistical Yearbook.

The per capita gross domestic product (*pgdp*) is (in ten yuan). The tertiary industry (*ter*) is (in thousand percent). The definition and source of variables that we adopted in this study are shown in < Table 4.3.1 >.

Chapter. 5

Empirical Results

5.1. Empirical Results for Guangdong Province

5.1.1. Description Statistics

< Table 5.1.1 >. Descriptive Analysis of Each Variable for Guangdong Province

Statistics	fdi	wage	ifs	edu	open	pgdp	ter
Mean	4.45	7.75	7.32	3.75	4.76	7.28	6.03
Median	4.81	7.67	7.23	3.85	4.83	7.34	5.98
Maximum	5.59	9.59	8.40	5.32	5.20	9.15	6.46
Minimum	1.65	6.15	6.38	1.95	4.19	4.63	5.57
Sta.Dev.	1.22	1.12	0.57	1.23	0.24	1.37	0.25
Skewness	1.23	0.17	0.50	-0.08	-0.51	-0.40	0.17
Kurtosis	3.10	1.64	2.20	1.36	2.56	2.00	2.00
Jarque-Bera	8.06	2.84	2.39	3.98	1.80	2.41	1.64
Probability	0.01	0.24	0.30	0.14	0.41	0.3	0.44

Observations	35	35	35	35	35	35	35

Source: Calculated by the author using E-views 10 for general sample from Guangdong Statistical Yearbook.

At the beginning of conducting the test for our study, we analyzed descriptive first for Guangdong province. The annual data period is from 1985 to 2019 that was utilized in our study. Therefore, the mean, median, maximum, minimum, std. Dev., skewness, kurtosis, Jarque-Bera, and probability for the descriptive statistics data of Guangdong province is introduced in < Table 5.1.1 >. The goal of this is to demonstrate that the data we adopted in our study is significant.

5.1.2. The Augmented Dickey-Fuller (ADF) Unit Root Test

we executed the unit root test of Augmented Dickey-Fuller (ADF) after analyzing descriptive analysis. Because it is essential to check the stationary for each variable in our study, in the ARDL model the variables can be I(0) or I(1) based on the assumption, which means the variables are stationary. However, when the variables are I(2) stationary biased results will occur. Consequently, we need to examine our study variables that ensure they maintain in I(0) or I(1). The unit root test results are shown in < Table 5.1.2 > that presented as follows for Guangdong province.

According to < Table 5.1.2 >, the variables foreign direct investment inflows, average wage, infrastructure, per capita GDP, trade openness, and education are cointegrated at first difference order one I(1). In contrast, the tertiary industry is cointegrated at level order I(0). All of the estimated variables in our study for Guangdong province are cointegrated at first difference order I(1) and level order I(0). Our estimated variables are not cointegrated of second

< Table 5.1.2 >. Result of ADF Unit Root Tests for Guangdong Province

Variable	Descriptions	Level form		1st Diff. form		Cointegration
		t-statistic	Prob.	t-statistic	Prob.	
fdi	Foreign Direct Investment Inflows	-1.295	0.872	-4.90	0.002	I(1)
wage	Average Wage	-2.639	0.266	-6.673	0.000	I(1)
ifs	Infrastructure	-1.102	0.913	-3.515	0.053	I(1)
pgdp	Per Capita GDP	-2.315	0.415	-3.393	0.07	I(1)
open	Trade Openness	-1.217	0.891	-6.607	0.000	I(1)
edu	Education	-1.595	0.773	-2.783	0.072	I(1)
ter	Tertiary Industry	-3.331	0.078			I(0)

difference order two I(2) indicates that in our study, the model of Guangdong province for the ARDL bounds test of co-integration is valid.

5.1.3. The Bounds Test for Co-integration Relationship

On the basis of ARDL model, the results from the co-integration test of the variables are introduced in the section. We exploit the F-statistic test to examine the joint significance of the lagged levels with equation (3). For no co-integration, the null hypothesis is defined as $Ho: \lambda = \theta = \mu = \pi = \psi = \omega = \chi = 0$ against the alternative hypothesis $H1$: $\lambda \neq 0$ or $\theta \neq 0$ or $\mu \neq 0$ or $\pi \neq 0$ or $\psi \neq 0$ or $\omega \neq 0$ or $\chi \neq 0$. The bounds test has two number of critical values, one is lower bound critical value, and the other is upper bound critical value. The null hypothesis for no co-integration will be rejected when the calculated F-statistic exceed the upper bound critical value and can make a conclusive inference. Alternatively, the null hypothesis for no co-integration will be accepted when the F-statistic under the lower bound critical. In < Table 5.1.3 > is the bounds test results of Guangdong province.

< Table 5.1.3 >. Result of Bound Test for Guangdong Province

Calculated F-statistic	8.36		
Critical F-statistic	Lower bound	Upper bound	Significant level
	2.33	3.25	10%
	2.63	3.62	5%
	3.27	4.39	1%

As per < Table 5.1.3 >, the lower bound value of critical F-statistic at 1 percent level of significance is 2.33 and at 1 percent level of significance is 4.39 for upper bound value. The calculated F-statistic is 8.36, obviously exceed the upper bound critical value (4.39) at 1 percent level of significance. Consequently, the null hypothesis for no co-integration is rejected, which illustrates that the co-integration relationship of the long run among the variables is exists.

5.1.4. Results of the Long Run and Short Run Coefficients

Since the bounds test indicated that a long run co-integration among the variables exists in the Guangdong province model, the equation (4) is estimated to acquire the long run coefficients between independent variables and dependent variable FDI. The results are presents in < Table 5.1.4 > indicated that shows as follows.

For the average wage, a 1 percent increase in the average wage, the inward FDI decrease by 2.22 percent. This result is consistent with our expectation and in line with Fu (2016) in his empirical test illustrates that average wage increase by 1 percent, and inward FDI decreases by 2.60 percent. We obtained the same result means that the FDI inflows in Guangdong province are low-labor seeking.

For the infrastructure, increase by 1 percent, the inward FDI increase by 2.39 percent. The outcome of that is as we expected. Wang (2011) found out that it raises 1 percent in infrastructure, the inward FDI raises 1.91 percent. Our result is equal to Wang (2011), and that indicates a higher level of infrastructure can increase the scale and efficiency of social production and reduce transportation costs. Therefore, we can see that FDI inflows are lower cost seeking in Guangdong province.

For the per capita GDP, enhance by 1 percent, FDI inflows promote by 3.29 percent. Our finding is consistent with Huang and Wei (2015), and in their study that increases 1 percent in per capita GDP, the inward FDI raise by 1.31

percent. And this result also in line with our expectations. We acquired the same outcomes, and the high value of the per capita GDP's coefficient in our study demonstrates that the market size is one of the most critical determinants of inward FDI in Guangdong province.

For the education, our findings are show an insignificance relationship between education and FDI for the test result of long run test. We found out that the main output of industry in Guangdong province is light industry such as cigarettes, canned food, and dairy food which those industries do not need the higher quality labor, and this is in line with Ma *et al.* (2011). They studied the located selection of FDI in Zhejiang province and explored that labor quality and FDI presented no significant result in their empirical tests. However, in our study, the Toda Yamamoto Granger causality test result presents that the education and FDI have unidirectional causal relationship shows in < Table 5.1.9 > and the education cause FDI, which means the human capital is one of the factors for determinants of FDI inflows to Guangdong province.

For trade openness, we obtained the result of long run test occurs no impact on the determinant of inward FDI for Guangdong province in the ARDL model test. Guangdong province as the production base of the manufacturing industry, the products produced by its foreign-funded enterprises are mainly for export. Therefore, the level of Guangdong province's opening to the outside world has always been an advantageous factor in attracting FDI. Many scholars also believe that the high level of openness in Guangdong province is a favorable factor in promoting FDI inflow. However, with more than 10 years of development, especially after the 2008 global financial crisis, Guangdong province has gradually changed its original foreign investment attraction model, reduced its dependence on foreign trade, and turned to domestic market seeking.

Therefore, our result of the trade openness variable shows insignificance. Nevertheless, the Toda-Yamamoto causality test presents the unidirectional causal relationship between trade openness and FDI see in < Table 5.1.9 >, which means the factor of trade openness still holds some impact on the determinant of inward FDI to Guangdong province.

< Table 5.1.4 >. Result of Long Run Coefficients of Guangdong Province

Variable	Coefficient	t-Statistic	Prob.
wage	-2.221***	-3.150	0.005
ifs	2.387***	4.593	0.000
edu	0.299	0.885	0.386
open	-0.366	-1.059	0.302
pgdp	3.289***	9.617	0.000
ter	-0.166	-0.699	0.518

Note: The statistical significance is presented as follows:1% (***), 5% (**), 10% (*).

For tertiary industry, the outcome of the long run test presented the relationship between tertiary industry and FDI is insignificance, which means the tertiary industry is not determinant of FDI into Guangdong province. The tertiary industry including restaurants, supermarkets, and real estate and so on. The main output of industry in Guangdong province is light industry such as cigarettes, canned food, and dairy food which link to the tertiary industry but weak. Thus, compared to the tertiary industry, the FDI is mainly for the secondary industry, which FDI is cost efficient and market seeking in Guangdong province. This is the result of our study is consistent with the findings of Guo and Shu (2012) and Wang (2011). Furthermore, Li (2015) states that FDI in China is mainly distributed in the secondary industry by adopting R language software analysis with data from 2008 - 2012.

< Table 5.1.5 >. Result of Short Run Coefficients of Guangdong Province

Variable	Coefficient	t-Statistic	Prob.
Constant	-12.400***	-9.696	0.000
$\Delta wage$	-0.348	-1.272	0.218
$\Delta wage_{t-1}$	1.500***	5.167	0.000
$\Delta pgdp$	2.038***	5.696	0.000
$\Delta pgdp_{t-1}$	-1.793***	-4.334	0.000
ΔECM_{t-1}	-0.891***	-9.504	0.000

Note: The statistical significance is presented as follows:1% (***), 5% (**), 10% (*).

The estimates of short run related to the long run relationship that was obtained from equation (5). The different terms ($\beta_i, \gamma_i, \delta_i, \eta_i, \varsigma_i, \kappa_i, \phi_i$) for coefficients are represent the elasticity of short run, while the coefficient of the ECM term (ψ) is stand for the speed of adjustment reoccur to the long run relationship among variables. Our empirical result of short run is shown in < Table 5.1.5 > states that short run impacts of the variables on determining inward FDI in Guangdong province are associated with the impacts of long run, despite it displays a different impact in certain periods. The coefficient (-0.89) of equilibrium correction is significant and it denotes a correct sign. This presents that the speed of adjustment is 89 percent after shock from the short run forwards to the long run equilibrium.

5.1.5. Diagnostic Tests of Models

In the ARDL model, there are various diagnostic tests implemented in order to examine the validity. For Guangdong province, the Breusch Godfrey serial correlation LM test expresses that the coefficient of equilibrium correction F-statistic is 0.80 and displays insignificance in the ARDL model of Guangdong province at degree of freedom (1, 19). It implies that the estimated model of Guangdong has no auto-correlation residual. Based on the Ramsey's RESET test, the coefficient of equilibrium correction F-statistic is 1.10 and shows

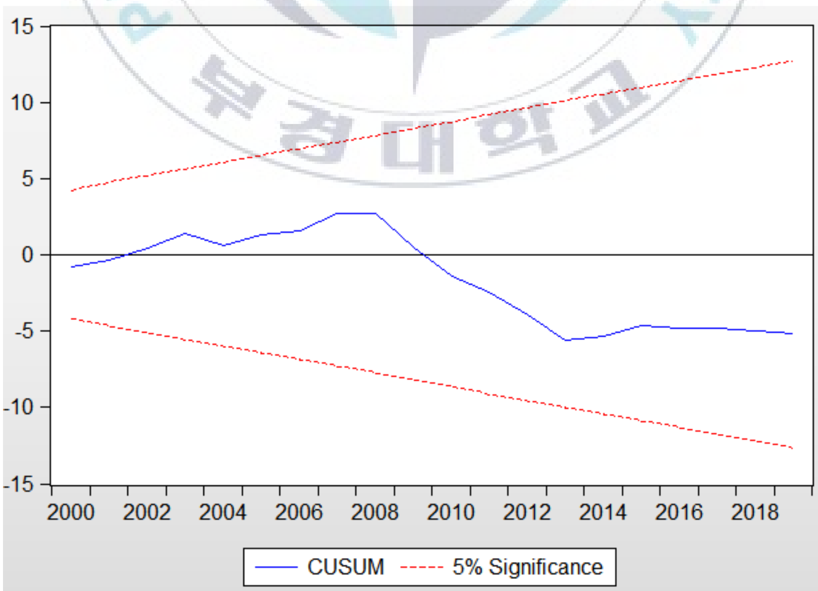
< Table 5.1.6 >. Result of Diagnostic Tests for Guangdong Province

	LM	RESET	R^2
F-statistic	0.800	1.072	0.994
df	(1, 19)	(1, 19)	
Prob.	0.382	0.313	
Prob. Chi-square (1)	0.248		

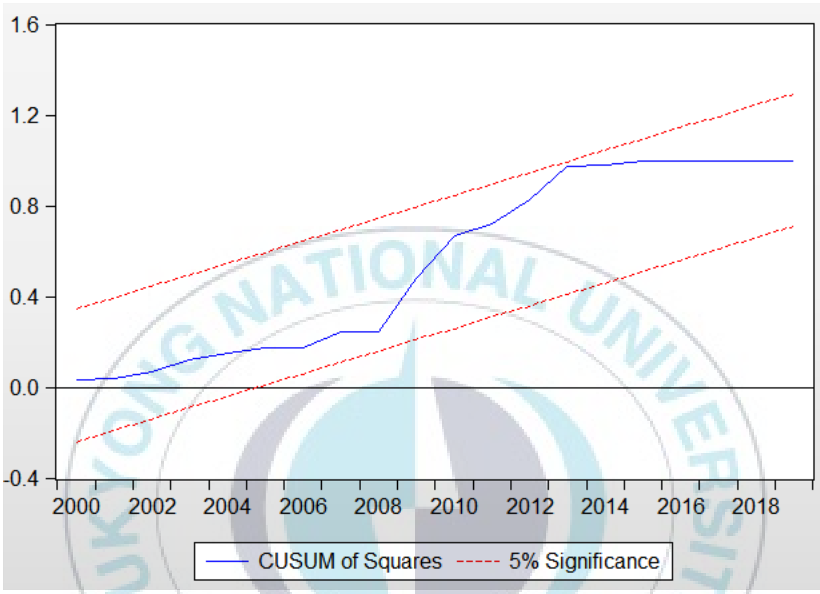
insignificance imply that our model function form is correct. The Chi-square also states insignificance with degree of freedom (1, 19). This means the model of Guangdong province is correctly specified. The value of R^2 is 0.99 indicates the estimated regression line is fit for our observations well and means the model is a goodness of fit overall measure. Those results of diagnostic tests are presented in < Table 5.1.6 >.

The stability of Guangdong province's model in terms of long run coefficients is checked by the cumulative sum of recursive residuals (CUSUM), and cumulative sum of the square of recursive residual (CUSUM of Square). The results indicate that all estimates of Guangdong province's model are stable in the level of significance at 5 percent over the period of sample. The result of CUSUM shows in < Table 5.1.7 > and the result of CUSUN of Square shows in < Table 5.1.8 >.

< Table 5.1.7 >. Result of CUSUM for Guangdong Province



< Table 5.1.8 >. Result of CUSUM of Square for Guangdong Province



5.1.6. Results of the Toda-Yamamoto Granger Causality Test

Since conducting the tests of co-integration and tests of diagnostic among the variables are not adequate to describe the direction of the causality flow. Hence, we conduct the causal relationship tests among the variable in the section. Regards the method of Toda-Yamamoto Granger causality test for Guangdong province, according to the equation from (6) to (12) the order of integration (d_{max}) of the series under consideration and the optimal lag k both are must to be determined for causality tests.

In our study, we comply with the procedure of Lütkepohl (2005) procedure via linking the lag length and number of endogenous variables in the system to the sample size. The outcome of causality tests is introduced in < Table. 5.1.9 >. On the basis of causality tests notes that the proofs of bidirectional causal relationship between FDI and the infrastructure. This implies that the infrastructure of transport of Guangdong province attracts more FDI inflows and the inward FDI impacts the infrastructure of transport. On the other hand, the unidirectional causal relationship results had been informed that from average wage to FDI, from education to FDI, from trade openness to FDI, and from per capita GDP to FDI, respectively. Those stand by the ARDL model's finding that among the cost efficiency, human capital, level of the opening up, and market size promote the inward FDI to Guangdong province.

< Table 5.1.9 >. Results of the Toda-Yamamoto Granger Causality Test

Independent Variable → Dependent Variable	Wald Statistic	P-Value	Causality Direction
wage → fdi	3.977**	0.046	Unidirectional
ifs → fdi	25.086***	0.000	Bidirectional
edu → fdi	3.894**	0.048	Unidirectional
open → fdi	2.923*	0.087	Unidirectional
pgdp → fdi	4.928**	0.026	Unidirectional
ter → fdi	0.651	0.420	
fdi → wage	1.803	0.179	

ifs ⟶ *wage*	6.323**	0.012	Unidirectional
edu ⟶ *wage*	0.459	0.498	
open ⟶ *wage*	1.952	0.162	
pgdp ⟶ *wage*	3.206*	0.073	Bidirectional
ter ⟶ *wage*	0.456	0.500	
fdi ⟶ *ifs*	9.324***	0.002	Bidirectional
wage ⟶ *ifs*	2.427	0.119	
edu ⟶ *ifs*	9.215***	0.002	Bidirectional
open ⟶ *ifs*	0.001	0.983	
pgdp ⟶ *ifs*	0.038	0.846	
ter ⟶ *ifs*	2.466	0.116	
fdi ⟶ *edu*	0.367	0.545	
wage ⟶ *edu*	0.210	0.647	
ifs ⟶ *edu*	3.540*	0.060	Bidirectional
open ⟶ *edu*	0.405	0.524	
pgdp ⟶ *edu*	0.287	0.592	
ter ⟶ *edu*	0.079	0.779	
fdi ⟶ *open*	0.006	0.941	
wage ⟶ *open*	1.178	0.278	

ifs → open	0.013	0.911	
edu → open	0.804	0.370	
pgdp → open	2.751*	0.097	Unidirectional
ter → open	1.024	0.312	
fdi → pgdp	0.018	0.894	
wage → pgdp	5.689**	0.015	Bidirectional
ifs → pgdp	5.521**	0.019	Unidirectional
edu → pgdp	0.154	0.695	
open → pgdp	0.702	0.402	
ter → pgdp	0.102	0.750	
fdi → ter	4.984**	0.026	Unidirectional
wage → ter	10.309***	0.001	Unidirectional
ifs → ter	0.880	0.348	
edu → ter	0.299	0.585	
open → ter	4.260**	0.039	Unidirectional
pgdp → ter	1.827	0.177	

Note: The statistical significance is presented as follows:1% (***), 5% (**), 10% (*).

Additionally, the inward FDI causes the tertiary industry, even though the tertiary industry has no effects on absorbing FDI inflow. That shows the FDI inflows to Guangdong province promote the development of tertiary industry in the local.

5.2. Empirical Results for Jiangsu Province

5.2.1. Description Statistics

< Table 5.2.1 >. Descriptive Analysis of Each Variables for Jiangsu Province

Statistics	fdi	wage	ifs	edu	open	pgdp	ter
Mean	4.12	7.57	6.97	4.35	5.41	7.31	5.94
Median	4.64	7.40	6.79	4.55	5.61	7.27	5.93
Maximum	5.88	9.57	7.94	5.63	6.38	9.42	6.40
Minimum	0.53	5.90	6.15	2.93	4.28	4.66	5.32
Sta.Dev.	1.71	1.25	0.57	1.05	0.67	1.49	0.24
Skewness	-0.94	0.19	0.17	-0.17	-0.33	-0.23	0.11
Kurtosis	2.51	1.58	1.64	1.31	1.80	1.83	3.32
Jarque-Bera	5.58	3.15	2.89	4.40	2.71	2.30	0.22
Probability	0.06	0.21	0.24	0.11	0.26	0.32	0.89

Observations	35	35	35	35	35	35	35

Source: Calculated by the author using E-views 10 for general sample from Jiangsu Statistical Yearbook.

Same as Guangdong province, we analyzed descriptive first Jiangsu province at the beginning of conducting the test for our study. The annual data period is also from 1985 to 2019 that was utilized in our study. Therefore, the mean, median, maximum, minimum, std. Dev., skewness, kurtosis, Jarque-Bera, and probability for the descriptive statistics data of Jiangsu province is introduced in < Table 5.2.1 >. The goal of this is to demonstrate that the data we adopted in our study is significant.

5.2.2. The Augmented Dickey-Fuller (ADF) Unit Root Test

We executed the unit root test of Augmented Dickey-Fuller (ADF) after we accomplish the analysis of descriptive. Because it is important to check the stationarity for each variable in our study. In the ARDL model the variables can be I(0) or I(1) based on the assumption, which means the variables are stationary. However, when the variables are I(2) stationary spurious results will occur. Consequently, we need to examine our study variables that ensure them maintain in I(0) or I(1). For Jiangsu province, the unit root test results are shown in < Table 5.2.2 > that presented as follows:

According to < Table 5.2.2 >, we can know that the variables foreign direct investment, average wage, per capita GDP, trade openness, education, and tertiary industry are cointegrated at first difference order one I(1). In contrast, infrastructure is cointegrated at level order I(0). All of the estimated variables in our study for Jiangsu province are cointegrated at first difference order I(1) and level order I(0). Our estimated variables are also not cointegrated of second

< Table 5.2.2 >. Result of ADF Unit Root Test for Jiangsu Province

Variable	Descriptions	Level form		1st Diff. form		Cointegration
		t-statistic	Prob.	t-statistic	Prob.	
fdi	Foreign Direct Investment Inflows	-0.810	0.955	-4.463	0.006	I(1)
wage	Average Wage	-3.039	0.137	-7.338	0.000	I(1)
ifs	Infrastructure	-3.943	0.021			I(0)
pgdp	Per Capita GDP	-2.535	0.311	-3.670	0.040	I(1)
open	Trade Openness	-1.180	0.899	-4.112	0.014	I(1)
edu	Education	-0.580	0.974	-4.184	0.012	I(1)
ter	Tertiary Industry	-2.410	0.368	-4.527	0.058	I(1)

difference order two I(2). In our study, the model of Jiangsu province for the ARDL bounds test of co-integration is valid.

5.2.3. The Bounds Test for Co-integration Relationship

On the basis of the ARDL model, the results from a co-integration test of the variables are introduced in the section. We exploit the F-statistic test to examine the joint significance of the lagged levels with equation (3). For no co-integration, the null hypothesis is defined as $Ho: \lambda = \theta = \mu = \pi = \psi = \omega = \chi = 0$ against the alternative hypothesis $H1$: $\lambda \neq 0$ or $\theta \neq 0$ or $\mu \neq 0$ or $\pi \neq 0$ or $\psi \neq 0$ or $\omega \neq 0$ or $\chi \neq 0$. The bounds test has two number of critical values, one is lower bound critical value and the other is upper bound critical value. The null hypothesis for no co-integration will be rejected when the calculated F-statistic exceed the upper bound critical value and can make a conclusive inference. Alternatively, the null hypothesis for no co-integration will be accepted when the F-statistic under the lower bound critical. In < Table 5.2.3 > is the bounds test results.

< Table 5.2.3 >. Result of Bound Test for Jiangsu Province

Calculated F-statistic	7.05		
Critical F-statistic	Lower bound	Upper bound	Significant level
	2.12	3.23	10%
	2.45	3.62	5%
	3.15	4.43	1%

As per < Table 5.2.3 >, the lower bound value of critical F-statistic at 1 percent level of significance is 2.12 and at 1 percent level of significance is 4.45 for upper bound value. The calculated F-statistic is 7.05, exceeding the upper bound critical value (4.43) at a 1 percent level of significance. Therefore, the null hypothesis of no co-integration is also rejected, which illustrates the co-integration relationship of the long run among the variables.

5.2.4. Results of the Long Run and Short Run Coefficients

Since the bounds test indicated that a long run co-integration among the variables exists in Jiangsu province's model, the equation (4) is estimated to acquire the long run coefficients between independent variables and dependent variable FDI. The results are presents in < Table 5.2.4 > indicated that as follows:

For the average wage, a 1 percent increase in the average wage, the inward FDI decrease by 5.41 percent. This result is consistent with our expectation and in line with Guo and Xin (2019) in their research, that apparent average enhances by 1 percent, and inward FDI is reduced by 3.01 percent. The same result that we obtained means the FDI inflows in Jiangsu province are low-labor seeking.

For the education, increase by 1 percent, the inward FDI increase by 2.50 percent. This result is equal to Shi (2011) that education promotes by a 1 percent, the inward FDI raises by 2.18 percent in his investigation. We obtain the same outcome, and it is consistent with our expectations. With the rapid development of high-tech industries in Jiangsu Province, the demand for high-quality technical personnel with higher education is growing. Therefore, the factor of education is one of crucial to determining the FDI inflows to Jiangsu province.

For the per capita GDP, enhance by 1 percent, FDI inflows promote by 3.58 percent. Our finding is consistent with Li and Chen (2010), and in their study that increases 1 percent in per capita GDP, the inward FDI rises by 2.42 percent. Additionally, this results also in line with our expectations. We acquired the same outcomes, but the high value of the per capita GDP's coefficient in our study demonstrates that the market size also is one of the most important determinants of inward FDI in Jiangsu province.

For infrastructure, we gain the result from the long run test presents no significant relationship between infrastructure and FDI that illustrates the infrastructure has no impact on attracting FDI inflow to Jiangsu province. We discovered that the main output of industries is cement, steel, car and refrigerator, and so on in Jiangsu province, but compared to Guangdong province, the number of freight traffic is much lower than in Guangdong province. Hence, the result of the infrastructure variable shows insignificance in Jiangsu province but significance in Guangdong province. Shi (2011) also detected that the infrastructure has no impact on attracting FDI in Jiangsu province.

< Table 5.2.4 > Result of Long Run Coefficients of Jiangsu Province

Variable	Coefficient	t-Statistic	Prob.
wage	-5.411**	-2.362	0.028
ifs	0.995	0.688	0.499
edu	2.504*	2.017	0.057
open	-0.960	-1.51	0.147
pgdp	3.583***	4.291	0.000

ter	2.205	1.180	0.252

Note: The statistical significance is presented as follows:1% (***), 5% (**), 10% (*).

For trade openness, we obtained the result from the long run test shows that there is no significant correlation between trade openness and inward FDI in Jiangsu province. This outcome is not our expectations. However, the statistics reveal that the growth of export, import, and income in Jiangsu province has decreased for the recent ten years, respectively. Even though all of them occur decline, the growth of income is still higher than the growth of export and growth of import, this indicates that the trend of inward FDI in Jiangsu province seems to turn to local market seeking. Therefore, the trade openness appears no impact for absorbing FDI into Jiangsu province.

For tertiary industry, the result of the long run test shows insignificance between tertiary industry and FDI. The tertiary industry including restaurants, supermarkets, and real estate, and so on. The main output of industry in Jiangsu province is heavy industry such as cement, steel, and refrigerator which link to the tertiary industry but weak. Thus, compared to the tertiary industry, the FDI is mainly for the secondary industry, which FDI is cost efficient and market seeking in Jiangsu province. This is in accord with Kim *et al.* (2012), in their studies discovered that FDI and the proportion of service segment which implies the industrial structure turns out to be insignificance. However, in the Toda-Yamamoto Granger causality tests, the unidirectional causal relationship from tertiary industry to FDI and the Wald statistic are high at 12.39. The level of significance at 1 percent shown in < Table 5.2.9 >. This indicates that the tertiary industry still plays a significant role in determining FDI inflow to Jiangsu province.

The estimates of the short run related to the long run relationship are the same as Guangdong province obtained from equation (5). The different terms

< Table 5.2.5 >. Result of Short Run Coefficients of Jiangsu Province

Variable	Coefficient	t-Statistic	Prob.
C	-2.667***	-7.636	0.000
Δwage	-0.800***	-2.863	0.010
Δedu	0.865***	3.453	0.003
Δedu_{t-1}	-0.899***	-3.774	0.001
Δter	-0.291**	-2.088	0.050
Δter_{t-1}	-0.466***	-3.374	0.003
ΔECM_{t-1}	-0.395***	-7.093	0.000

Note: The statistical significance is presented as follows:1% (***), 5% (**), 10% (*).

($\beta_i, \gamma_i, \delta_i, \eta_i, \varsigma_i, \kappa_i, \phi_i$) for coefficients are represent the elasticity of short run, while the coefficient of the ECM term (ψ) is stand for the speed of adjustment reoccur to the long run relationship among variables. Our empirical result of the short run is shown in < Table 5.2.5 > states that short-run impacts of the variables on determining inward FDI in Jiangsu province are associated with the long run impacts, despite its different impact in specific periods. The coefficient (-0.40) of equilibrium correction is significant, and it denotes a correct sign. This presents that the speed of adjustment is 40 percent after shock begin with the short run towards to the long run equilibrium.

5.2.5. Diagnostic Tests of Models

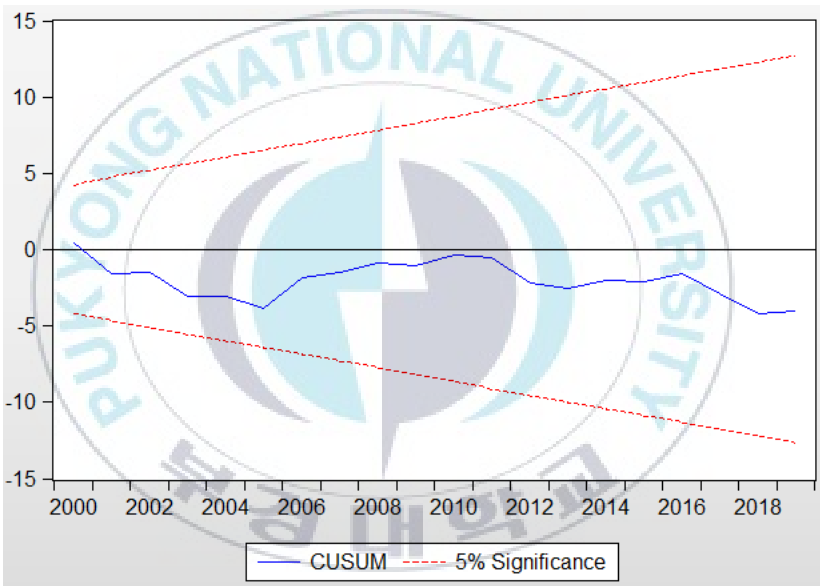
In the ARDL model, there are various diagnostic tests are implemented in order to examine the validity. For Jiangsu province, the Breusch-Godfrey serial correlation LM test expresses that the coefficient of equilibrium correction F-statistic is 0.54 and displays insignificance in the ARDL model of Jiangsu province at degree of freedom (1, 19). It implies the estimated model of Jiangsu has no autocorrelation residual. Based on Ramsey's RESET test, the coefficient of equilibrium correction F-statistic is 2.16 and shows insignificance means our model function form is correct. The Chi-square also states insignificance with degree of freedom (1, 19). This means the model of Jiangsu province is correctly specified. And the value of R^2 is 0.99 indicates that the estimated regression line is fit for our observations well and means the model is a goodness of fit overall measure. Those results of diagnostic tests are presented in < 5.2.6 > as below:

< Table 5.2.6 >. Result of Diagnostic Tests for Jiangsu Province

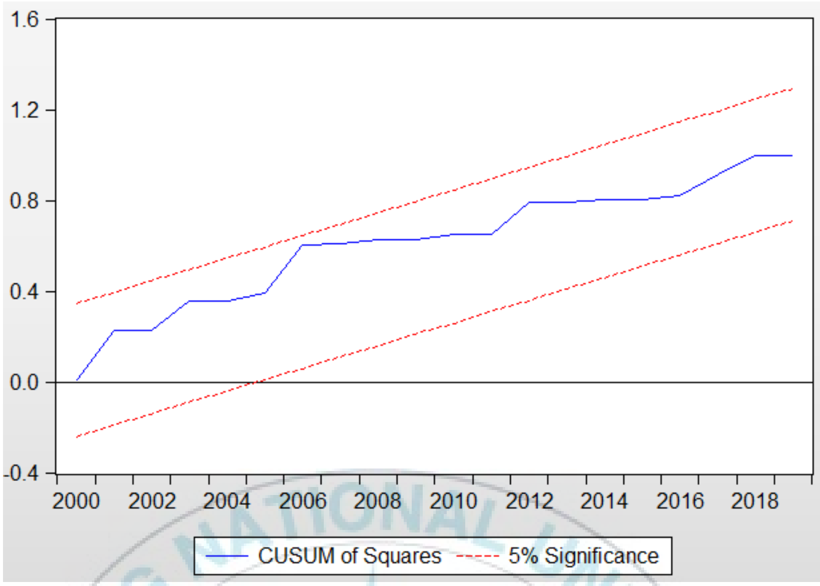
	LM	RESET	R^2
F-statistic	0.538	2.162	0.994
df	(1,19)	(6,14)	

Prob.	0.472	0.110	
Prob. Chi-square (1)	0.341		

< Table 5.2.7 >. Result of CUSUM for Jiangsu Province



< Table 5.2.8 >. Result of CUSUM of Square for Jiangsu Province



The stability of Jiangsu province's model in terms of long run coefficients is also checked by the cumulative sum of recursive residuals (CUSUM), and cumulative sum of the square of recursive residual (CUSUM of Square). The results indicate that all estimates of Jiangsu province's model are stable in the level of significance at 5 percent over the period of the sample that shows in < Table 5.2.7 > and < Table 5.2.8 >, respectively.

5.2.6. Result of the Toda-Yamamoto Granger Causality Test

This chapter same as Guangdong province because conducting the tests of co-integration and tests of diagnostic among the variables are not adequate to describe the direction of the causality flow. Hence, we conduct the causal relationship tests among the variable in the section. Regarding the method of Toda-Yamamoto for Jiangsu province, according to the equation from (6) to (12) the order of integration (d_{max}) of the series under consideration and the optimal lag k both are must to be determined for causality tests.

In our study, we comply with the procedure of Lütkepohl (2005) via linking the both of the lag length and number of endogenous variables in the system to the sample size. The outcome of causality tests is introduced in < Table. 5.2.9 >. On the basis of the causality test, the unidirectional causal relationship results had been informed from average wage to FDI, from education to FDI, and from tertiary industry to FDI.

< Table 5.2.9 >. **Results of the Toda-Yamamoto Granger Causality Test**

Independent Variable → Dependent Variable	Wald Statistic	P-Value	Causality Direction
wage → *fdi*	5.858**	0.016	Unidirectional
ifs → *fdi*	1.401	0.237	
edu → *fdi*	3.266*	0.071	Unidirectional
open → *fdi*	0.622	0.430	
pgdp → *fdi*	0.020	0.886	
ter → *fdi*	12.394***	0.000	Unidirectional
fdi → *wage*	0.383	0.536	
ifs → *wage*	0.382	0.537	
edu → *wage*	0.056	0.814	
open → *wage*	2.259	0.133	
pgdp → *wage*	3.182*	0.075	Unidirectional
ter → *wage*	0.466	0.495	
fdi → *ifs*	3.895**	0.048	Unidirectional
wage → *ifs*	0.144	0.704	
edu → *ifs*	3.637*	0.057	Unidirectional
open → *ifs*	4.884**	0.027	Unidirectional

pgdp → *ifs*	0.008	0.928	
ter → *ifs*	6.254**	0.012	Unidirectional
fdi → *edu*	0.105	0.746	
wage → *edu*	5.655**	0.017	Unidirectional
ifs → *edu*	0.048	0.272	
open → *edu*	1.076	0.300	
pgdp → *edu*	0.422	0.516	
ter → *edu*	0.000	0.986	
fdi → *open*	0.204	0.652	
wage → *open*	2.010	0.156	
ifs → *open*	2.271	0.132	
edu → *open*	6.954***	0.008	Unidirectional
pgdp → *open*	1.167	0.280	
ter → *open*	3.741*	0.053	Bidirectional
fdi → *pgdp*	12.965***	0.000	Unidirectional
wage → *pgdp*	2.337	0.126	
ifs → *pgdp*	5.309**	0.021	Unidirectional
edu → *pgdp*	4.141**	0.042	Unidirectional
open → *pgdp*	0.018	0.892	

ter → pgdp	16.375***	0.001	Unidirectional
fdi → ter	0.559	0.455	
wage → ter	0.211	0.646	
ifs → ter	0.868	0.352	
edu → ter	0.164	0.685	
open → ter	9.325***	0.002	Bidirectional
pgdp → ter	0.032	0.859	

Note: The statistical significance is presented as follows:1% (***), 5% (**), 10% (*).

In addition, the unidirectional causal relationship results that from FDI to Per capita GDP and the Wald statistic is very high indicates inward FDI in Jiangsu province promotes the local per capita GDP. In addition, the unidirectional causal relationship results that from FDI to infrastructure demonstrates the FDI inflows to Jiangsu province enhance and strengthen the infrastructure of transport of Jiangsu province.

Chapter 6

Conclusion and Policy Recommendation

6.1 Conclusion

6.1.1 Guangdong Province

In our study, in the beginning, the Guangdong province attracts the most inward FDI and the top one in China. However, according to the statistics, some factors of Guangdong province to absorb the inward FDI are getting less attractive, and about ten years period, the inward FDI of Jiangsu province surpassed Guangdong province. It indicates that the matter of the determinant of FDI in Guangdong province is essential. Many studies are concentrated on FDI in China as China is the biggest country to absorb the most FDI in Asia. However, the study of FDI in China on the province level is scarce.

Consequently, we investigate the determinants of inward FDI in Guangdong province in this article. We adopted the ARDL model as the empirical approach so as to acquire reliable outcomes because we have a small number of observations. The annual data from 1985 to 2019 are utilized in the estimation.

The bounds test result declares that there is a relationship of long run between variables and inward FDI. The outcomes of the empirical test for the long run analysis illustrate that the average wage is proxied by the labor cost of Guangdong province and has a negative relationship with inward FDI. This implies that lower the cost of labor promotes the FDI inflows to Guangdong province. Furthermore, the infrastructure is instead of for the degree of traffic development. It has a positive relationship with inward FDI that denotes the FDI into Guangdong province also cost efficiency seeking. The more developed the transportation, the cost of it will reduce more as well. In addition, the per capita GDP is represented for the market size. It shows the positive relationship with inward FDI illustrates that a larger size of the market improves the FDI inflow to Guangdong province. However, the variables of education, trade openness and tertiary industry appear insignificance relationship with FDI demonstrates that they do not determine inward FDI. The findings from long run perspective hint that the cost efficiency seeking for inward FDI plays an essential role in Guangdong province. Besides, the market seeking inward FDI and can be interpreted by the same factors of determinant based on aforesaid empirical findings.

Moreover, the short run influences of the variables are in line with the long run impacts, even though it occurs different effects in specific periods. The Toda-Yamamoto approach of the Granger causality tests exhibits the bidirectional causal relationship between infrastructure and FDI. The unidirectional causal relationships are presented from average wage to FDI, from education to FDI, trade openness to FDI, and per capita GDP to FDI, respectively. Nevertheless, there is no causal relationship between tertiary industry and FDI. The outcomes from the Granger causality tests support the findings from the ARDL model.

6.1.2 Jiangsu Province

In our study, Jiangsu province is the top two to attracts the most inward FDI in China. However, in about ten years, the inward FDI of Jiangsu province surpassed Guangdong province and even for recent years. Nonetheless, the statistics presented that the growth of inward FDI in Jiangsu province is slowly and even drop in recent years. It indicates that the matter of the determinant of FDI in Jiangsu province is essential. Many studies are concentrated on FDI in China as China is the biggest country to absorb most FDI in Asia. However, the study of FDI in China on the province level is scarce.

Consequently, we investigate the determinants of inward FDI in Jiangsu province as well as in this article. We adopted the ARDL model as the empirical approach to acquire reliable outcomes because we have a small number of observations. The annual data from 1985 to 2019 are utilized in the estimation.

The bounds test result declares that there is a long run relationship between the variables and inward FDI. The outcomes of the empirical test for the long run analysis illustrate that the average wage is proxied by the labor cost of Jiangsu province and has a negative relationship with inward FDI. This implies that lower the cost of labor promotes the FDI inflows to Jiangsu province. Furthermore, education is instead of for the human capital and has a positive relationship with inward FDI that denotes the FDI into Jiangsu province are also high-tech seeking. In addition, the per capita GDP is represented by the market size. It shows the positive relationship with inward FDI illustrates that a larger size of the market improves the FDI inflow to Jiangsu province. However, the variables of infrastructure, trade openness, and tertiary industry appear insignificance relationship with FDI demonstrates that they do not determine inward FDI. The findings from the long run perspective hint that the cost efficiency seeking inward FDI plays an essential role in Jiangsu province. Besides, the market seeking for the inward FDI as well as can be interpreted by the same factors of determinant on the basis of aforesaid empirical findings.
same factors of determinant on the basis of aforesaid empirical findings.

Moreover, the short run influences of the variables are in line with the long run impacts, although it occurs the different effects in certain periods. The Toda-Yamamoto approach of the Granger causality tests exhibits the evidence of unidirectional causal relationships from average wage to FDI, from education to FDI, and from Tertiary industry to FDI, respectively. Nevertheless, there is no causal relationship between infrastructure and FDI, trade openness and FDI, and per capita GDP and FDI, respectively. The outcomes from the Granger causality tests support the findings from the ARDL model.

6.2 Policy Recommendation

In our study, the outcomes are significant in terms of policy recommendations for Guangdong province from three perspectives. The first one is the average wage. To attract more low labor cost-seeking FDI, the local government should ensure a low wage level.

The second one is infrastructure. As the better infrastructure of traffic can reduce the cost of transport, the local government should expand transportation, including highway, railway, waterway, civil aviation, and pipelines for stimulating the FDI inflow to Guangdong province, which is cost efficiency seeking.

Last but not least is per capita GDP. For absorbing more market seeking FDI, the local government should promote economic development sustaining.

In our study, the outcomes are significant in terms of policy recommendations for Jiangsu province from three perspectives. The first one is the average wage. To attract more low labor cost-seeking FDI, the local government should ensure the low wage level.

The second one is education. For the high-tech seeking FDI, the government of Jiangsu province should give support and keep the high levels of education for the students.

Last but not least is per capita GDP. For absorbing more market seeking FDI into Jiangsu province, the local government should promote economic development sustaining.

6.3. Limitation of the Study

At present, to our best knowledge. There are two limitations in our study that as follows:

The first one is the policy factor of local government like the tax reduction. It is a potential variable. Nevertheless, we cannot find the data. Therefore, we pick up six variables in our study.

The second one is that we use annual time-series data with a concise number of observations.

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Appendices

Appendix 1: Data Descriptions of Guangdong Province

Year	lnfdi	lnwage	lnifs	lnedu	lnopen	lnpgdp	lnter
1985	1.65	6.16	6.38	1.94	4.64	4.63	6.17
1986	1.86	6.15	6.49	2.06	4.64	4.76	6.46
1987	1.77	6.24	6.60	2.16	4.53	4.97	5.94
1988	2.22	6.39	6.68	2.27	4.60	5.26	5.76
1989	2.45	6.47	6.73	2.31	4.56	5.42	5.65
1990	2.68	6.48	6.78	2.26	4.85	5.52	6.01
1991	2.90	6.49	6.88	2.23	4.99	5.68	5.98
1992	3.57	6.59	7.01	2.28	4.99	5.91	5.75
1993	4.32	6.83	7.09	2.46	4.87	6.23	5.56
1994	4.54	6.72	7.08	2.62	5.20	6.48	5.76
1995	4.62	6.90	6.99	2.72	4.99	6.70	5.75
1996	4.76	7.00	6.93	2.80	4.89	6.82	5.82
1997	4.76	7.06	6.90	2.86	4.93	6.92	5.76
1998	4.79	7.12	6.93	2.92	4.83	6.99	5.76
1999	4.80	7.22	7.00	3.09	4.83	7.04	5.89
2000	4.81	7.42	7.08	3.40	4.87	7.16	5.94
2001	4.87	7.55	7.16	3.64	4.79	7.24	6.22
2002	4.88	7.67	7.23	3.85	4.90	7.34	6.11
2003	5.05	7.79	7.29	4.07	4.99	7.49	5.83

2004	4.61	7.89	7.28	4.29	5.05	7.65	5.87
2005	4.82	7.98	7.28	4.47	5.04	7.82	6.05
2006	4.74	8.10	7.29	4.61	5.06	7.96	5.99
2007	5.14	8.26	7.33	4.72	5.02	8.12	5.97
2008	5.26	8.47	7.41	4.80	4.86	8.24	5.98
2009	5.31	8.58	7.49	4.89	4.65	8.29	6.19
2010	5.31	8.69	7.63	4.83	4.74	8.42	5.91
2011	5.38	8.85	7.76	5.03	4.70	8.55	6.14
2012	5.46	8.99	7.92	5.09	4.67	8.61	6.28
2013	5.52	9.07	8.06	5.14	4.67	8.69	6.29
2014	5.59	9.18	8.14	5.19	4.57	8.77	6.17
2015	5.59	9.27	8.19	5.22	4.45	8.83	6.32
2016	5.45	9.32	8.23	5.24	4.36	8.91	6.42
2017	5.43	9.40	8.30	5.26	4.33	9.00	6.38
2018	5.39	9.52	8.35	5.28	4.30	9.06	6.38
2019	5.40	9.59	8.40	5.32	4.19	9.15	6.46

Appendix 2: ADF Unit Root Test for LNFDI of Guangdong Province

Null Hypothesis: D(LNFDI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.899315	0.0021
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNFDI,2)
Method: Least Squares
Date: 04/05/21 Time: 11:10
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNFDI(-1))	-0.888565	0.181365	-4.899315	0.0000
C	0.259170	0.092701	2.795771	0.0089
@TREND("1985")	-0.009141	0.004140	-2.207734	0.0351

R-squared	0.444479	Mean dependent var	-0.006113
Adjusted R-squared	0.407445	S.D. dependent var	0.262924
S.E. of regression	0.202393	Akaike info criterion	-0.270706
Sum squared resid	1.228884	Schwarz criterion	-0.134659
Log likelihood	7.466642	Hannan-Quinn criter.	-0.224930
F-statistic	12.00170	Durbin-Watson stat	1.974688
Prob(F-statistic)	0.000148		

Appendix 3: ADF Unit Root Test for LNWAGE of Guangdong Province

Null Hypothesis: D(LNWAGE) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.673071	0.0000
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNWAGE,2)
Method: Least Squares
Date: 04/05/21 Time: 11:14
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNWAGE(-1))	-1.171126	0.175500	-6.673071	0.0000
C	0.102605	0.027095	3.786918	0.0007
@TREND("1985")	0.001052	0.001203	0.874334	0.3889

R-squared	0.599912	Mean dependent var	0.002495
Adjusted R-squared	0.573240	S.D. dependent var	0.098028
S.E. of regression	0.064038	Akaike info criterion	-2.572162
Sum squared resid	0.123027	Schwarz criterion	-2.436116
Log likelihood	45.44068	Hannan-Quinn criter.	-2.526387
F-statistic	22.49179	Durbin-Watson stat	2.064928
Prob(F-statistic)	0.000001		

Appendix 4: ADF Unit Root Test for LNIFS of Guangdong Province

Null Hypothesis: D(LNIFS) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.515064	0.0552
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNIFS,2)
Method: Least Squares
Date: 04/05/21 Time: 11:16
Sample (adjusted): 1989 2019
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNIFS(-1))	-0.428063	0.121780	-3.515064	0.0016
D(LNIFS(-1),2)	0.577231	0.157795	3.658101	0.0011
D(LNIFS(-2),2)	0.134617	0.187494	0.717978	0.4792
C	0.011814	0.013126	0.900043	0.3764
@TREND("1985")	0.000646	0.000614	1.050918	0.3030

R-squared	0.482441	Mean dependent var	-0.001254
Adjusted R-squared	0.402817	S.D. dependent var	0.038043
S.E. of regression	0.029399	Akaike info criterion	-4.069018
Sum squared resid	0.022472	Schwarz criterion	-3.837730
Log likelihood	68.06978	Hannan-Quinn criter.	-3.993624
F-statistic	6.058967	Durbin-Watson stat	1.897851
Prob(F-statistic)	0.001390		

Appendix 5: ADF Unit Root Test for LNEDU of Guangdong Province

Null Hypothesis: D(LNEDU) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.782977	0.0716
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNEDU,2)
Method: Least Squares
Date: 04/05/21 Time: 11:18
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNEDU(-1))	-0.405436	0.145684	-2.782977	0.0091
C	0.038908	0.019377	2.007903	0.0534

R-squared	0.199896	Mean dependent var	-0.002069
Adjusted R-squared	0.174086	S.D. dependent var	0.079627
S.E. of regression	0.072365	Akaike info criterion	-2.355498
Sum squared resid	0.162337	Schwarz criterion	-2.264801
Log likelihood	40.86572	Hannan-Quinn criter.	-2.324981
F-statistic	7.744959	Durbin-Watson stat	2.080230
Prob(F-statistic)	0.009091		

Appendix 6: ADF Unit Root Test for LNOPEN of Guangdong Province

Null Hypothesis: D(LNOPEN) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.606702	0.0000
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNOPEN,2)
Method: Least Squares
Date: 04/05/21 Time: 11:19
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNOPEN(-1))	-1.183793	0.179181	-6.606702	0.0000
C	0.067176	0.044051	1.524961	0.1377
@TREND("1985")	-0.004593	0.002204	-2.084152	0.0458

R-squared	0.592923	Mean dependent var	-0.003262
Adjusted R-squared	0.565785	S.D. dependent var	0.175431
S.E. of regression	0.115600	Akaike info criterion	-1.390849
Sum squared resid	0.400903	Schwarz criterion	-1.254803
Log likelihood	25.94900	Hannan-Quinn criter.	-1.345073
F-statistic	21.84810	Durbin-Watson stat	2.013627
Prob(F-statistic)	0.000001		

Appendix 7: ADF Unit Root Test for LNPGDP of Guangdong Province

Null Hypothesis: D(LNPGDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.392678	0.0697
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNPGDP,2)
Method: Least Squares
Date: 04/05/21 Time: 11:20
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNPGDP(-1))	-0.522367	0.153969	-3.392678	0.0020
C	0.114300	0.036949	3.093428	0.0043
@TREND("1985")	-0.002519	0.001087	-2.317092	0.0275

R-squared	0.279422	Mean dependent var	-0.001218
Adjusted R-squared	0.231383	S.D. dependent var	0.054244
S.E. of regression	0.047556	Akaike info criterion	-3.167309
Sum squared resid	0.067847	Schwarz criterion	-3.031263
Log likelihood	55.26060	Hannan-Quinn criter.	-3.121534
F-statistic	5.816620	Durbin-Watson stat	1.526202
Prob(F-statistic)	0.007332		

Appendix 8: ADF Unit Root Test for LNTER of Guangdong Province

Null Hypothesis: LNTER has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.331047	0.0784
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNTER)
Method: Least Squares
Date: 04/05/21 Time: 11:21
Sample (adjusted): 1986 2019
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTER(-1)	-0.470322	0.141193	-3.331047	0.0022
C	2.671897	0.817890	3.266819	0.0027
@TREND("1985")	0.009405	0.003407	2.760587	0.0096

R-squared	0.283991	Mean dependent var	0.008369
Adjusted R-squared	0.237797	S.D. dependent var	0.185664
S.E. of regression	0.162092	Akaike info criterion	-0.717207
Sum squared resid	0.814489	Schwarz criterion	-0.582528
Log likelihood	15.19252	Hannan-Quinn criter.	-0.671277
F-statistic	6.147779	Durbin-Watson stat	1.917325
Prob(F-statistic)	0.005639		

Appendix 9: Breusch-Godfrey Serial Correlation LM Test of Guangdong Province

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.799962	Prob. F(1,19)	0.3823
Obs*R-squared	1.333272	Prob. Chi-Square(1)	0.2482

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 04/05/21 Time: 11:24
Sample: 1987 2019
Included observations: 33
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNFDI(-1)	0.111130	0.191550	0.580163	0.5686
LNWAGE	0.391659	0.896022	0.437109	0.6670
LNWAGE(-1)	0.051268	0.486675	0.105343	0.9172
LNWAGE(-2)	0.046218	0.365987	0.126283	0.9008
LNIFS	-0.350468	0.709516	-0.493954	0.6270
LNEDU	-0.159744	0.369873	-0.431890	0.6707
LNOPEN	0.161491	0.384194	0.420337	0.6790
LNPGDP	-0.062925	0.767545	-0.081983	0.9355
LNPGDP(-1)	-0.177103	0.946228	-0.187167	0.8535
LNPGDP(-2)	-0.208973	0.692239	-0.301881	0.7660
LNTER	-0.014221	0.216326	-0.065740	0.9483
C	0.833294	3.384700	0.246194	0.8082
@TREND	0.034219	0.081816	0.418246	0.6805
RESID(-1)	-0.280884	0.314046	-0.894406	0.3823

R-squared	0.040402	Mean dependent var	-2.18E-15
Adjusted R-squared	-0.616165	S.D. dependent var	0.082261
S.E. of regression	0.104577	Akaike info criterion	-1.381362
Sum squared resid	0.207792	Schwarz criterion	-0.746480
Log likelihood	36.79247	Hannan-Quinn criter.	-1.167743
F-statistic	0.061536	Durbin-Watson stat	2.056234
Prob(F-statistic)	0.999996		

Appendix 10: Ramsey RESET Test of Guangdong Province

Ramsey RESET Test
Equation: UNTITLED
Specification: LNFDI LNFDI(-1) LNWAGE LNWAGE(-1) LNWAGE(-2) LNIFS LNEDU LNOPEN LNPGDP LNPGDP(-1) LNPGDP(-2) LNTER C @TREND
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.035492	19	0.3134
F-statistic	1.072244	(1, 19)	0.3134

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.011567	1	0.011567
Restricted SSR	0.216541	20	0.010827
Unrestricted SSR	0.204974	19	0.010788

Unrestricted Test Equation:
Dependent Variable: LNFDI
Method: ARDL
Date: 04/05/21 Time: 11:26
Sample: 1987 2019
Included observations: 33
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic):
Fixed regressors: C @TREND

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNFDI(-1)	0.183547	0.161582	1.135938	0.2701
LNWAGE	-0.484058	0.787458	-0.614710	0.5460
LNWAGE(-1)	-0.039189	0.487989	-0.080307	0.9368
LNWAGE(-2)	-1.949794	0.564128	-3.456298	0.0026
LNIFS	2.936727	0.978643	3.000816	0.0073
LNEDU	0.438477	0.361948	1.211436	0.2406
LNOPEN	-0.608835	0.433251	-1.405269	0.1761
LNPGDP	3.018760	1.213800	2.487033	0.0223
LNPGDP(-1)	-1.581468	1.129692	-1.399911	0.1777
LNPGDP(-2)	2.698221	1.087917	2.480173	0.0227
LNTER	-0.161358	0.214643	-0.751751	0.4614
C	-19.04642	7.387770	-2.578102	0.0184
@TREND	-0.371394	0.152130	-2.441292	0.0246
FITTED^2	-0.052979	0.051163	-1.035492	0.3134

R-squared	0.994170	Mean dependent var	4.612196
Adjusted R-squared	0.990181	S.D. dependent var	1.048208
S.E. of regression	0.103866	Akaike info criterion	-1.395020
Sum squared resid	0.204974	Schwarz criterion	-0.760138
Log likelihood	37.01782	Hannan-Quinn criter.	-1.181401
F-statistic	249.2401	Durbin-Watson stat	2.418821
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Appendix 11: Toda-Yamamoto Granger Causality Test of Guangdong Province

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 04/05/21 Time: 11:57
Sample: 1985 2019
Included observations: 33

Dependent variable: LNFDI

Excluded	Chi-sq	df	Prob.
LNWAGE	3.976603	1	0.0461
LNIFS	25.08577	1	0.0000
LNEDU	3.894840	1	0.0484
LNOPEN	2.922694	1	0.0873
LNPGDP	4.927892	1	0.0264
LNTER	0.651093	1	0.4197
All	33.80756	6	0.0000

Dependent variable: LNWAGE

Excluded	Chi-sq	df	Prob.
LNFDI	1.803363	1	0.1793
LNIFS	6.323463	1	0.0119
LNEDU	0.458757	1	0.4982
LNOPEN	1.951505	1	0.1624
LNPGDP	3.206043	1	0.0734
LNTER	0.455550	1	0.4997
All	10.91095	6	0.0912

Dependent variable: LNIFS

Excluded	Chi-sq	df	Prob.
LNFDI	9.324089	1	0.0023
LNWAGE	2.426875	1	0.1193
LNEDU	9.215026	1	0.0024
LNOPEN	0.000459	1	0.9829
LNPGDP	0.037651	1	0.8461
LNTER	2.465736	1	0.1164
All	26.87337	6	0.0002

Dependent variable: LNEDU

Excluded	Chi-sq	df	Prob.
LNFDI	0.367249	1	0.5445
LNWAGE	0.210381	1	0.6465
LNIFS	3.537988	1	0.0600
LNOPEN	0.405258	1	0.5244
LNPGDP	0.286882	1	0.5922
LNTER	0.078489	1	0.7794
All	9.319316	6	0.1564

Dependent variable: LNOPEN

Excluded	Chi-sq	df	Prob.
LNFDI	0.005577	1	0.9405
LNWAGE	1.177778	1	0.2778
LNIFS	0.012644	1	0.9105
LNEDU	0.803740	1	0.3700
LNPGDP	2.750603	1	0.0972
LNTER	1.024030	1	0.3116
All	5.077593	6	0.5339

Dependent variable: LNPGDP

Excluded	Chi-sq	df	Prob.
LNFDI	0.017677	1	0.8942
LNWAGE	5.868941	1	0.0154
LNIFS	5.521368	1	0.0188
LNEDU	0.153737	1	0.6950
LNOPEN	0.701726	1	0.4022
LNTER	0.101603	1	0.7499
All	11.44691	6	0.0755

Dependent variable: LNTER

Excluded	Chi-sq	df	Prob.
LNFDI	4.983848	1	0.0256
LNWAGE	10.30897	1	0.0013
LNIFS	0.880188	1	0.3482
LNEDU	0.298577	1	0.5848
LNOPEN	4.259948	1	0.0390
LNPGDP	1.826477	1	0.1765
All	23.89711	6	0.0005

Appendix 12: Data Descriptions of Jiangsu Province

Year	lnfdi	lnwage	lnifs	lnedu	lnopen	lnpgdp	lnter
1985	0.53	5.96	6.15	2.95	4.28	4.66	5.59
1986	0.74	5.90	6.22	2.95	4.47	4.78	5.78
1987	0.92	5.92	6.28	2.96	4.44	4.98	5.93
1988	1.10	6.08	6.32	2.93	4.30	5.24	5.93
1989	1.28	6.21	6.28	2.99	4.28	5.32	5.95
1990	1.48	6.10	6.24	3.08	4.60	5.35	5.92
1991	1.55	6.07	6.25	3.05	4.74	5.46	6.37
1992	2.84	6.23	6.35	3.10	4.63	5.74	5.66
1993	3.49	6.44	6.47	3.25	4.50	6.07	5.88
1994	3.76	6.36	6.59	3.36	4.96	6.36	5.32
1995	3.97	6.57	6.67	3.38	5.07	6.60	5.61
1996	4.01	6.68	6.72	3.43	5.08	6.74	5.80
1997	4.22	6.75	6.72	3.51	5.16	6.84	5.82
1998	4.24	6.90	6.70	3.64	5.19	6.91	5.83
1999	4.20	7.01	6.73	3.91	5.28	6.97	5.69
2000	4.16	7.13	6.75	4.12	5.52	7.07	5.75
2001	4.30	7.27	6.78	4.38	5.53	7.16	6.00
2002	4.64	7.40	6.79	4.55	5.70	7.27	5.89
2003	5.06	7.55	6.85	4.91	5.97	7.42	5.80
2004	4.80	7.70	6.93	4.90	6.17	7.61	5.79
2005	4.88	7.85	7.03	5.04	6.29	7.82	5.89
2006	5.16	8.00	7.15	5.15	6.37	7.97	5.91

2007	5.39	8.19	7.28	5.26	6.38	8.14	5.97
2008	5.53	8.42	7.36	5.32	6.27	8.31	5.93
2009	5.53	8.57	7.45	5.37	5.97	8.41	5.98
2010	5.65	8.70	7.54	5.35	6.08	8.59	5.95
2011	5.77	8.87	7.65	5.43	6.01	8.75	6.01
2012	5.88	8.70	7.66	5.63	5.93	8.84	5.97
2013	5.81	9.14	7.66	5.45	5.82	8.94	6.12
2014	5.64	9.22	7.62	5.45	5.76	9.03	6.16
2015	5.49	9.30	7.66	5.46	5.69	9.10	6.12
2016	5.50	9.30	7.70	5.47	5.61	9.18	6.40
2017	5.53	9.38	7.75	5.49	5.66	9.28	6.37
2018	5.54	9.48	7.81	5.52	5.67	9.35	6.38
2019	5.57	9.57	7.94	5.56	6.08	9.42	6.30

Appendix 13: ADF Unit Root Test for LNFDI of Jiangsu Province

Null Hypothesis: D(LNFDI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.462783	0.0061
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNFDI,2)
Method: Least Squares
Date: 04/05/21 Time: 11:46
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNFDI(-1))	-0.794419	0.178010	-4.462783	0.0001
C	0.290269	0.112192	2.587252	0.0148
@TREND("1985")	-0.009741	0.004962	-1.963152	0.0590

R-squared	0.399075	Mean dependent var	-0.005782
Adjusted R-squared	0.359013	S.D. dependent var	0.307131
S.E. of regression	0.245894	Akaike info criterion	0.118677
Sum squared resid	1.813918	Schwarz criterion	0.254723
Log likelihood	1.041831	Hannan-Quinn criter.	0.164452
F-statistic	9.961523	Durbin-Watson stat	1.937983
Prob(F-statistic)	0.000481		

Appendix 14: ADF Unit Root Test for LNWAGE of Jiangsu Province

Null Hypothesis: D(LNWAGE) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.338350	0.0000
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNWAGE,2)
Method: Least Squares
Date: 04/05/21 Time: 11:47
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNWAGE(-1))	-1.264315	0.172289	-7.338350	0.0000
C	0.104012	0.041978	2.477755	0.0191
@TREND("1985")	0.001965	0.002030	0.967958	0.3408

R-squared	0.643356	Mean dependent var	0.004427
Adjusted R-squared	0.619580	S.D. dependent var	0.176367
S.E. of regression	0.108780	Akaike info criterion	-1.512469
Sum squared resid	0.354993	Schwarz criterion	-1.376423
Log likelihood	27.95574	Hannan-Quinn criter.	-1.466693
F-statistic	27.05873	Durbin-Watson stat	2.108874
Prob(F-statistic)	0.000000		

Appendix 15: ADF Unit Root Test for LNIFS of Jiangsu Province

Null Hypothesis: LNIFS has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.943357	0.0212
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNIFS)
Method: Least Squares
Date: 04/05/21 Time: 11:48
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNIFS(-1)	-0.228156	0.057858	-3.943357	0.0005
D(LNIFS(-1))	0.763564	0.118884	6.422768	0.0000
C	1.367960	0.345500	3.959363	0.0004
@TREND("1985")	0.013090	0.003203	4.086948	0.0003

R-squared	0.636772	Mean dependent var	0.052143
Adjusted R-squared	0.599197	S.D. dependent var	0.050683
S.E. of regression	0.032087	Akaike info criterion	-3.927509
Sum squared resid	0.029858	Schwarz criterion	-3.746114
Log likelihood	68.80389	Hannan-Quinn criter.	-3.866475
F-statistic	16.94657	Durbin-Watson stat	1.908076
Prob(F-statistic)	0.000002		

Appendix 16: ADF Unit Root Test for LNOPEN of Jiangsu Province

Null Hypothesis: D(LNOPEN) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.112999	0.0143
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNOPEN,2)
Method: Least Squares
Date: 04/05/21 Time: 11:49
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNOPEN(-1))	-0.828485	0.201431	-4.112999	0.0003
C	0.062509	0.067422	0.927141	0.3613
@TREND("1985")	-0.001161	0.003206	-0.361977	0.7199

R-squared	0.371874	Mean dependent var	0.006726
Adjusted R-squared	0.329999	S.D. dependent var	0.204334
S.E. of regression	0.167255	Akaike info criterion	-0.652091
Sum squared resid	0.839223	Schwarz criterion	-0.516045
Log likelihood	13.75951	Hannan-Quinn criter.	-0.606316
F-statistic	8.880577	Durbin-Watson stat	1.725506
Prob(F-statistic)	0.000935		

Appendix 17: ADF Unit Root Test for LNPGDP of Jiangsu Province

Null Hypothesis: D(LNPGDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.669871	0.0404
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNPGDP,2)
Method: Least Squares
Date: 04/05/21 Time: 11:50
Sample (adjusted): 1990 2019
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNPGDP(-1))	-0.620226	0.169005	-3.669871	0.0012
D(LNPGDP(-1),2)	0.612643	0.160025	3.828430	0.0008
D(LNPGDP(-2),2)	0.062190	0.147868	0.420579	0.6778
D(LNPGDP(-3),2)	0.118897	0.148204	0.802252	0.4303
C	0.138658	0.036797	3.768134	0.0009
@TREND("1985")	-0.002547	0.000930	-2.738451	0.0114

R-squared	0.537286	Mean dependent var	-0.000138
Adjusted R-squared	0.440887	S.D. dependent var	0.052530
S.E. of regression	0.039279	Akaike info criterion	-3.459412
Sum squared resid	0.037028	Schwarz criterion	-3.179172
Log likelihood	57.89118	Hannan-Quinn criter.	-3.369761
F-statistic	5.573572	Durbin-Watson stat	2.221451
Prob(F-statistic)	0.001517		

Appendix 18: ADF Unit Root Test for LNTER of Jiangsu Province

Null Hypothesis: D(LNTER) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.526796	0.0058
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNTER,2)
Method: Least Squares
Date: 04/05/21 Time: 11:50
Sample (adjusted): 1990 2019
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNTER(-1))	-2.545471	0.562312	-4.526796	0.0001
D(LNTER(-1),2)	0.910567	0.459549	1.981435	0.0591
D(LNTER(-2),2)	0.716806	0.337514	2.123779	0.0442
D(LNTER(-3),2)	0.301778	0.187723	1.607571	0.1210
C	-0.073930	0.085635	-0.863311	0.3965
@TREND("1985")	0.005721	0.004146	1.380009	0.1803

R-squared	0.810272	Mean dependent var	-0.003066
Adjusted R-squared	0.770745	S.D. dependent var	0.388475
S.E. of regression	0.186004	Akaike info criterion	-0.349243
Sum squared resid	0.830338	Schwarz criterion	-0.069003
Log likelihood	11.23864	Hannan-Quinn criter.	-0.259592
F-statistic	20.49936	Durbin-Watson stat	1.946385
Prob(F-statistic)	0.000000		

Appendix 19: Breush-Godfry Serial Correlation LM Test of Jiangsu Province

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.537841	Prob. F(1,19)	0.4723
Obs*R-squared	0.908430	Prob. Chi-Square(1)	0.3405

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 04/05/21 Time: 11:51
Sample: 1987 2019
Included observations: 33
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNFDI(-1)	-0.065034	0.198233	-0.328068	0.7464
LNWAGE	0.156722	0.481589	0.325427	0.7484
LNWAGE(-1)	0.003469	0.312944	0.011084	0.9913
LNIFS	-0.105766	0.511278	-0.206867	0.8383
LNEDU	-0.022741	0.367706	-0.061845	0.9513
LNEDU(-1)	-0.030339	0.472228	-0.064246	0.9494
LNEDU(-2)	-0.064793	0.364912	-0.177558	0.8609
LNOPEN	0.078236	0.227240	0.344288	0.7344
LNPGDP	0.045330	0.461290	0.098268	0.9227
LNTER	-0.078106	0.248052	-0.314877	0.7563
LNTER(-1)	-0.088483	0.272394	-0.324835	0.7489
LNTER(-2)	-0.028952	0.187901	-0.154081	0.8792
C	0.691790	3.434975	0.201396	0.8425
RESID(-1)	0.223015	0.304093	0.733377	0.4723

R-squared	0.027528	Mean dependent var	-7.12E-16
Adjusted R-squared	-0.637847	S.D. dependent var	0.116815
S.E. of regression	0.149498	Akaike info criterion	-0.666649
Sum squared resid	0.424644	Schwarz criterion	-0.031767
Log likelihood	24.99971	Hannan-Quinn criter.	-0.453031
F-statistic	0.041372	Durbin-Watson stat	1.851003
Prob(F-statistic)	1.000000		

Appendix 20: Ramsey RESET Test of Jiangsu Province

Ramsey RESET Test
Equation: UNTITLED
Specification: LNFDI LNFDI(-1) LNWAGE LNWAGE(-1) LNIFS LNEDU LNEDU(-1) LNEDU(-2) LNOPEN LNPGDP LNTER LNTER(-1) LNTER(-2) C
Omitted Variables: Powers of fitted values from 2 to 3

	Value	df	Probability
F-statistic	2.740713	(2, 18)	0.0914

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.101934	2	0.050967
Restricted SSR	0.436665	20	0.021833
Unrestricted SSR	0.334731	18	0.018596

Unrestricted Test Equation:
Dependent Variable: LNFDI
Method: ARDL
Date: 04/05/21 Time: 11:52
Sample: 1987 2019
Included observations: 33
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic):
Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNFDI(-1)	1.005448	0.414030	2.428444	0.0259
LNWAGE	-1.252909	0.503160	-2.490080	0.0228
LNWAGE(-1)	-1.803358	0.773963	-2.330030	0.0316
LNIFS	1.570044	0.682806	2.299400	0.0337
LNEDU	1.432030	0.663991	2.156700	0.0448
LNEDU(-1)	-1.064580	0.690167	-1.542496	0.1404
LNEDU(-2)	1.460621	0.586803	2.489118	0.0228
LNOPEN	-0.646855	0.247353	-2.615113	0.0175
LNPGDP	1.354460	0.811790	1.668487	0.1125
LNTER	-0.282993	0.281007	-1.007067	0.3272
LNTER(-1)	1.092413	0.409629	2.666831	0.0157
LNTER(-2)	0.640153	0.249866	2.561991	0.0196
C	-9.222668	4.262597	-2.163627	0.0442
FITTED^2	-0.057460	0.183119	-0.313785	0.7573
FITTED^3	-0.003298	0.016943	-0.194675	0.8478

R-squared	0.995472	Mean dependent var	4.329885
Adjusted R-squared	0.991951	S.D. dependent var	1.519945
S.E. of regression	0.136368	Akaike info criterion	-0.843967
Sum squared resid	0.334731	Schwarz criterion	-0.163736
Log likelihood	28.92546	Hannan-Quinn criter.	-0.615090
F-statistic	282.6723	Durbin-Watson stat	2.089931
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Appendix 21: Toda-Yamamoto Granger Causality Test of Jiangsu Province

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 04/05/21 Time: 12:08
Sample: 1985 2019
Included observations: 33

Dependent variable: LNFDI

Excluded	Chi-sq	df	Prob.
LNWAGE	5.858206	1	0.0155
LNIFS	1.401055	1	0.2365
LNEDU	3.266093	1	0.0707
LNOPEN	0.622224	1	0.4302
LNPGDP	0.020397	1	0.8864
LNTER	12.39449	1	0.0004
All	20.92258	6	0.0019

Dependent variable: LNWAGE

Excluded	Chi-sq	df	Prob.
LNFDI	0.383330	1	0.5358
LNIFS	0.381740	1	0.5367
LNEDU	0.055487	1	0.8138
LNOPEN	2.259430	1	0.1328
LNPGDP	3.181684	1	0.0745
LNTER	0.466236	1	0.4947
All	9.126397	6	0.1666

Dependent variable: LNIFS

Excluded	Chi-sq	df	Prob.
LNFDI	3.894937	1	0.0484
LNWAGE	0.144228	1	0.7041
LNEDU	3.636848	1	0.0565
LNOPEN	4.884397	1	0.0271
LNPGDP	0.008153	1	0.9281
LNTER	6.253720	1	0.0124

All	14.08036	6	0.0288

Dependent variable: LNEDU

Excluded	Chi-sq	df	Prob.
LNFDI	0.105052	1	0.7458
LNWAGE	5.655530	1	0.0174
LNIFS	0.047626	1	0.8272
LNOPEN	1.075981	1	0.2996
LNPGDP	0.421653	1	0.5161
LNTER	0.000325	1	0.9856
All	6.801998	6	0.3395

Dependent variable: LNOPEN

Excluded	Chi-sq	df	Prob.
LNFDI	0.203598	1	0.6518
LNWAGE	2.010233	1	0.1562
LNIFS	2.271022	1	0.1318
LNEDU	6.953993	1	0.0084
LNPGDP	1.166537	1	0.2801
LNTER	3.740912	1	0.0531
All	15.12210	6	0.0193

Dependent variable: LNPGDP

Excluded	Chi-sq	df	Prob.
LNFDI	12.96463	1	0.0003
LNWAGE	2.337480	1	0.1263
LNIFS	5.308596	1	0.0212
LNEDU	4.141414	1	0.0418
LNOPEN	0.018446	1	0.8920
LNTER	16.37463	1	0.0001
All	28.91267	6	0.0001

Dependent variable: LNTER

Excluded	Chi-sq	df	Prob.
LNFDI	0.559368	1	0.4545
LNWAGE	0.211390	1	0.6457
LNIFS	0.867689	1	0.3516
LNEDU	0.164433	1	0.6851
LNOPEN	9.325129	1	0.0023
LNPGDP	0.031501	1	0.8591
All	19.41651	6	0.0035