

**THE RELATIONSHIP OF OPENNESS AND INVESTMENT  
BASED ON CHINA'S PROVINCIAL PANEL DATA**



**Zhang Yanyun**

**A Thesis Submitted in Partial  
Fulfillment of the Requirements for the Degree of  
Master of Economics (Economics and Management)  
School of Development Economics  
National Institute of Development Administration  
2020**

**THE RELATIONSHIP OF OPENNESS AND INVESTMENT  
BASED ON CHINA'S PROVINCIAL PANEL DATA**

**Zhang Yanyun**

**School of Development Economics**

---

..... Major Advisor  
(Assistant Professor Athakrit Thepmongkol, Ph.D.)

The Examining Committee Approved This Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Economics (Economics and Management).

..... Committee Chairperson  
(Assistant Professor Suthawan Prukumpai, Ph.D.)

..... Committee  
(Assistant Professor Athakrit Thepmongkol, Ph.D.)

..... Committee  
(Associate Professor Yuthana Sethapramote, Ph.D.)

..... Dean  
(Associate Professor Amornrat Apinunmahakul, Ph.D.)

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
\_\_\_\_\_

## ABSTRACT

<b>Title of Thesis</b>	THE RELATIONSHIP OF OPENNESS AND INVESTMENT BASED ON CHINA'S PROVINCIAL PANEL DATA
<b>Author</b>	Zhang Yanyun
<b>Degree</b>	Master of Economics (Economics and Management)
<b>Year</b>	2020

---

This thesis investigates whether openness determines investment in each region of China over the period of 2002 to 2017. In particular, the investment is decomposed into the foreign direct investment and the domestic investment. Using the panel data analysis, the results show that openness has no impact on all types of investment except the positive impact on FDI in the east of China. This implies that more policies should be implemented in the western region to be more foreigner-friendly in order to attract more FDI.

## ACKNOWLEDGEMENTS

With the completion of the thesis, my graduate study is about to end. I would like to express my gratefulness to those people who have offered help and encouragement in the process of thesis writing and my study.

Firstly, special gratitude should go to my supervisor Dr. Athakrit Thepmongkol for his patient instruction and encouragement. In the process of thesis writing, he gave me valuable suggestions on the selecting of research topic, data collection, writing of the thesis and correcting the grammatical errors. I benefit a lot from his guide.

Secondly, deeply gratitude should go to all the professors who gave me support in the past two years. Under their guidance, I learned a lot of knowledge.

Lastly, I would like to thanks all of my classmates, friends and my family. They gave a lot of support to my study and daily life.

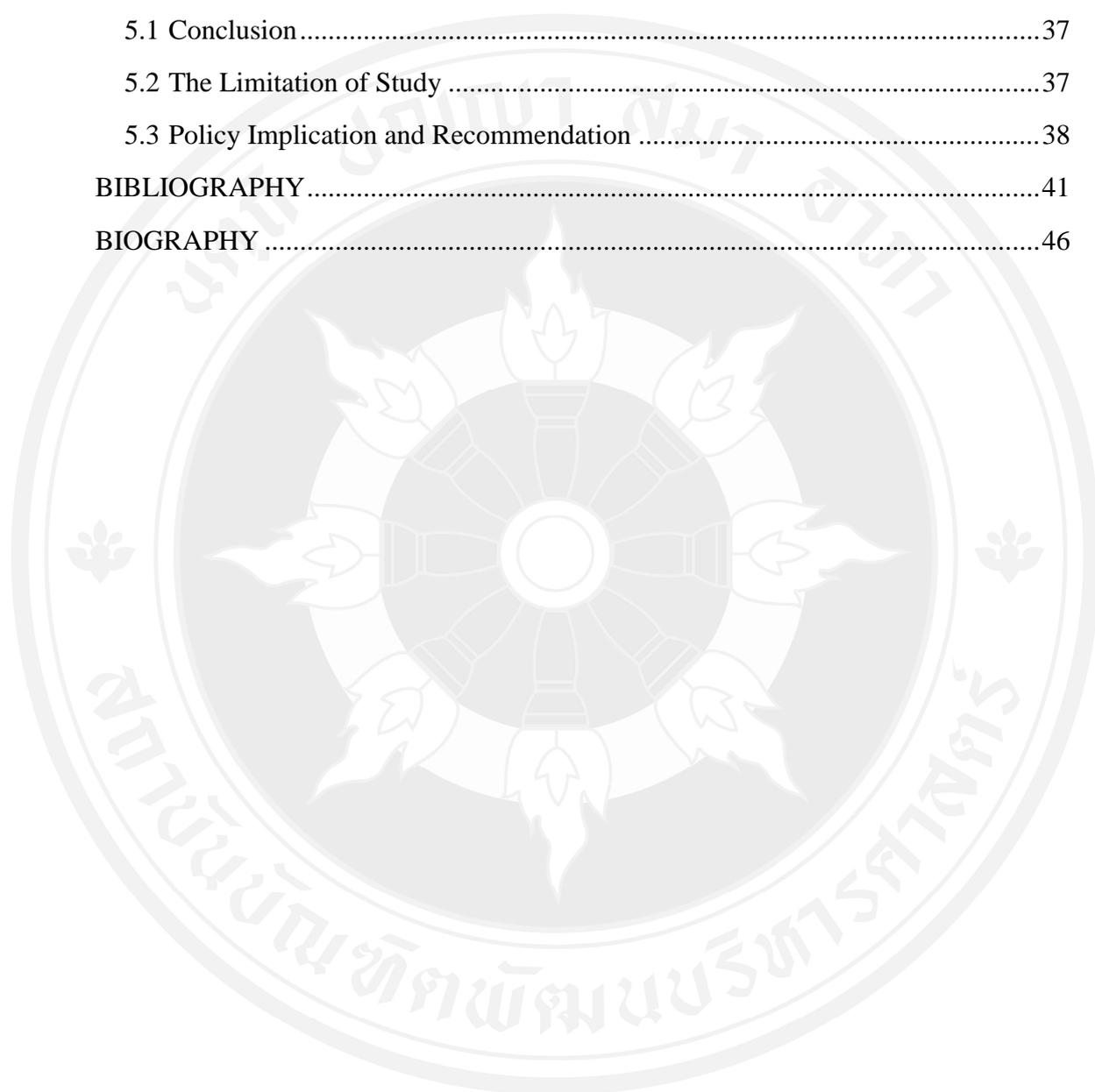
Zhang Yanyun

April 2021

## TABLE OF CONTENTS

	<b>Page</b>
ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES.....	vii
LIST OF FIGURES.....	viii
CHAPTER 1 INTRODUCTION.....	1
1.1 How openness affects investment.....	1
1.2 The Introduction of China's Opening-up.....	3
1.3 Research Motivation and Objective.....	8
CHAPTER 2 LITERATURE REVIEW.....	10
2.1 Openness and Trade Openness.....	10
2.2 The Measure of Trade Openness.....	11
2.3 The Theory of Investment.....	13
2.4 Openness and Investment.....	14
CHAPTER 3 METHODOLOGY.....	20
3.1 Data and Indicators.....	20
3.2 Unit Root Test.....	22
3.3 Model Specification.....	22
3.4 Regression Model.....	24
CHAPTER 4 EMPRICAL ANALYSIS.....	25
4.1 Descriptive Statistics.....	25
4.2 Unit Root Test.....	27
4.3 Estimation Result.....	29
4.3.1 Hausman Test.....	29
4.4 Regression.....	30

4.5 Result and Discussion.....	33
4.5.1 Model of FDI.....	33
4.5.2 Model of Domestic Investment .....	35
CHAPTER 5 CONCLUSION AND RECOMMENDATION .....	37
5.1 Conclusion.....	37
5.2 The Limitation of Study .....	37
5.3 Policy Implication and Recommendation .....	38
BIBLIOGRAPHY.....	41
BIOGRAPHY .....	46

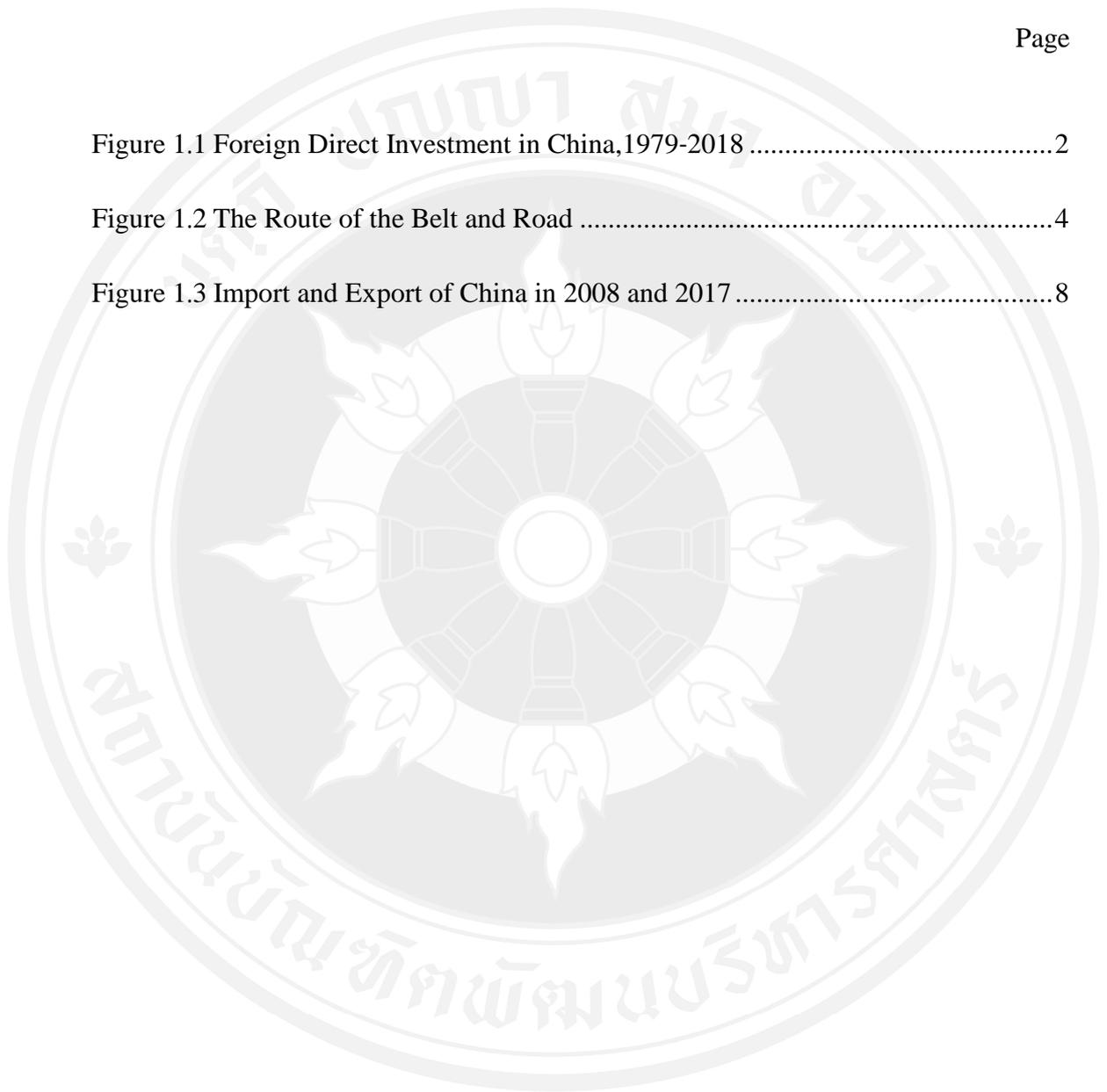


## LIST OF TABLES

	Page
Table 1.1 The Economic Zones and Agreement of China.....	5
Table 3.1 Raw Data.....	21
Table 3.2 Indicators.....	22
Table 4.1 Descriptive Statistics of Overall Sample Set .....	25
Table 4.2 Descriptive Statistics of West Sample Set .....	26
Table 4.3 Descriptive Statistic of East Sample Set .....	27
Table 4.4 Unit Root Test.....	27
Table 4.5 The Result of Hausman Test of FDI and DOIVN Model .....	29
Table 4.6 The Regression Result: FDI is dependent variable. ....	31
Table 4.7 The Regression Result: Domestic investment is dependent variable.....	32

## LIST OF FIGURES

	Page
Figure 1.1 Foreign Direct Investment in China,1979-2018 .....	2
Figure 1.2 The Route of the Belt and Road .....	4
Figure 1.3 Import and Export of China in 2008 and 2017 .....	8



# CHAPTER 1

## INTRODUCTION

### 1.1 How openness affects investment

As the process of economic globalization advances, economic activities among countries become more common. Trade liberalization or trade openness is at the core of globalization. Thus, more countries actively adopt various policies to improve trade openness for their economic developments. Before the financial crisis in 2008, the average annual growth rate of world trade openness is about 3%. After the financial crisis, however, this growth rate is only about 1% from 2009 to 2018. This means that the room for increasing the openness level of the world is still large.

Not only is China an advocate of openness, but it is also a beneficiary. Since the reform and opening-up policy were implemented, the economy has grown rapidly. From 1978 to 2017, the economy expands at an average annual rate of 9.5%, 2.9% higher than the world's average over the same period. From 1978 to 2017, the total foreign trade of China rises from \$20.64 billion to \$4.1 trillion, with an average annual growth rate of 14.5%. Its share in global foreign trade increases from 0.77% to about 10%. Not only does the open economic environment promote the development of domestic investment, but also attracts a large amount of foreign direct investment. The rapid growth in total fixed-asset investment is a significant force driving the development of the economy after the opening policy. From 1981 to 2017, the total investment adds up to 490 trillion yuan, with an average annual increase rate of 20.2%. As show in Figure 1.1, foreign direct investment increases from almost zero in 1978 to \$138.31 billion in 2018. According to the business survey result of the UNCTAD in the first quarter of 2017, China ranks first among developing countries and second globally in

the ranking of investment destinations for global multinational corporate executives from 2017 to 2019.

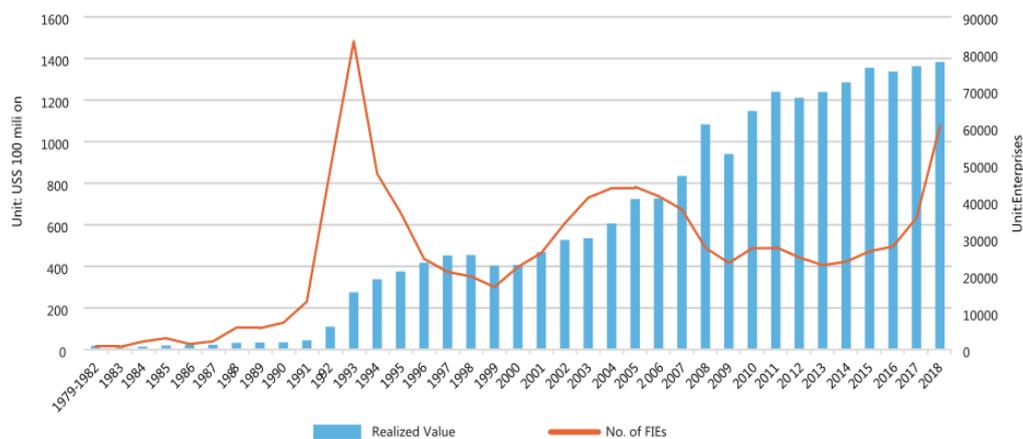


Figure 1.1 Foreign Direct Investment in China, 1979-2018

Source: Statistical Bulletin of FDI in China, 2019

How does trade openness affect economic development? This question is answered by Baldwin and Seghezza (1996). Some other researchers also confirm that openness enhances economic development through investment (Dowrick & Golley, 2004; Kim et al., 2011). Baldwin and Seghezza (1996) find that openness affects economic growth only through investment. First, trade liberalization can increase capital demand and accelerate the accumulation of capital. And it results in price change and the capital-intensive sectors can enjoy a favorable price. Second, due to openness, the price of capital is lower by reducing the marginal cost of investment goods. Third, openness has a competitive effect, which causes a reduction in the price of capital goods and speeds up the formation of transitional capital. Finally, due to the competition caused by openness, there is less wedge in financial intermediation, then the capital stock is boosted in a steady state.

Kim et al. (2011) suggest that openness can stimulate investment and promote economic performance and capital accumulation only in high-income countries. Lal (2017) points out that trade openness encourages foreign direct investment by providing

an “open business environment” signal to foreign investors and lowering transaction cost. By using provincial data from 2005 to 2017, Li (2019) studies the relationship between openness, economic growth, and urban-rural income gap of China. The empirical result illustrates that the comprehensive openness of the eastern region has a strongly positive influence on economic development. Openness weakly stimulates the development of the economy in the central and the western regions or the less developed regions. He believes that this is related to the investment environment. The impact of increasing openness level on the economy is greatly and obviously in areas with more investment opportunities and a better investment environment.

## **1.2 The Introduction of China's Opening-up**

Economic reform and opening-up have been basic national policies of China, which begins in the late 1970s. During the initial stage of the opening policy implementation, China's opening-up strategies introduce international capital flow and net export orientation which is determined by resource status and economic development level. At this stage, five special economic zones are established, and 14 coastal port industrial cities are opened, creating a favorable environment for attracting more foreign investment and facilitating exports.

In the early 1990s, China's opening-up moves to a new stage. The opening strategy at this stage is to combine “bringing in” and “going out”. “Bringing in” refers to actively attracting foreign investment. “Going out” refers to encouraging domestic enterprises to actively carry out international cooperation and exchange. During this period, opening areas gradually expand from coastal cities to the inland provinces. Economic development zones and high-tech development zones are also established. The openness is greatly improved.

Joining WTO at the beginning of the 21st century brings more opportunities to China. It implies that China is truly moving towards full-scale, multi-level, and wide-

ranging openness (Quan, 2018). In 2013, the president of China, Xi Jinping, proposes the construction of “The Belt and Road” initiative, which aims to create the interconnection between China and the countries along the route and promote the process of international economic cooperation and globalization. As shown in Figure 1.2, these two routes start from Luoyang and Quanzhou respectively. There are 65 countries along these two routes. By August 2019, 136 countries and 30 international organizations have signed 195 cooperation documents with China on the Belt and Road Initiative. For China's inland border provinces, this is a good opportunity, which gives them more opportunities to trade with other countries and increase openness level.



Figure 1.2 The Route of the Belt and Road

Source: <http://www.xinhuanet.com/silkroad/english/index.htm>, 2020

In recent years, China has introduced many measures to accelerate the process of opening-up in inland regions, for example setting up economic zones. So far many economic zones have been established which are shown in Table 1.1. By the end of 2019, there are 17 free trade agreements and 22 countries are involved. By September 2020, China has established 21 Pilot Free Trade Zones. But most are distributed in the central and eastern regions. There are only five in the west.

Table 1.1 The Economic Zones and Agreement of China

Name of the Economic Zone	Quantity
Key National Development and Opening Experimental Zones along the Border	7
Border Economic Cooperation Zones	17
Cross-border Economic Cooperation Zone	2
New Open Economic System Comprehensive Experimental Pilot Area	12
Inland Open Economic Pilot Zone	2
International Cooperation Demonstration Zone	1
Comprehensive Reform of Border Finance Pilot Area	2
Pilot Free Trade Zone	18
Free Trade Agreement	16

China's opening-up has been driven for about 40 years. The openness level has greatly improved, and the overall economy has developed rapidly. Although the regional economic development gap has narrowed in recent years, the development in different regions is still different, especially in foreign trade. The Figure 1.3 shows that in 2008 and 2017, the eastern region has the largest foreign trade volume, \$2248.71 billion and \$3382.54 billion respectively, much more than the western region.

The western region refers to 12 provinces in western China. The land area of this region accounts for about 70% of the total land area. But its population is less than 30% of the total population. Although this region is rich in resources, its economy still lags far behind the central and eastern regions owing to the harsh natural environment, outdated infrastructure and no opening policy. However, with the implementation of the development plan for the western region and the proposition of the Belt and Road Initiative in 2013, the economy develops at a high-speed rate. In 2017, the urban and rural residents' earning rise greatly. The per capita disposable income goes up by over

10%. Over the past five years, more than 35 million poor people have achieved better income. From 2012 to 2018, the rural poverty incidence rate drops from 17.6% to 3.2%. From 2013 to 2017, the total output rises from 12.7 trillion yuan to 17.1 trillion yuan in the region, with an average annual increase rate of 8.8%, and its proportion in the national GDP increases from 19.8% to 20.0%. In 2000, the foreign trade volume of the western region only accounts for 3.6% of the national total. Although this proportion rises to 7.8% in 2014, it drops slightly to 6.8% in 2018. Wang and Zhang (2018) point out that the development of foreign trade in the western region is mainly restricted by the following factors: industrial structure, product structure, and unreasonable market structure. The commodities for exporting are with low value added. The complex trade procedures and the high trade costs are also the factors that impede the development of foreign trade.

There are six provinces in the central region. The land area is about 1.028 million square kilometers and the permanent population is about 368 million. Although its land area only accounts for 10.7 % of the country, the population in this region is 26.51% of the total population. According to the China Bureau of Statistics, from 2006 to 2017, the average annual GDP growth rate of the central region is 10.8% ie. 1.9 percentage points higher than the national average growth rate. The proportion of its GDP in the country's total rises from 18.6% to 21.0%. The GDP grows by 7.8% in 2018. The foreign trade volume of the central region rises from \$219.6 billion to \$314 billion from 2013 to 2018, and its proportion in the country's foreign trade rises from 5.3% to 6.8%. In 2018, the foreign capital in the central region is \$ 8.94 billion, increasing by 19.2% (year-on-year) which is much faster than the national average.

The east is the most developed region among the four regions. The opening-up policy is first carried out in the provinces of this region. During the 1980s, the government firstly establishes 5 special economic zones in Shenzhen, Zhuhai, Shantou, Xiamen and Hainan. After that, the economic and technological development zones are established in 14 coastal port cities, including Dalian and Qinhuangdao, and so on.

Three economic zones, namely Yangtze River Delta, Pearl River Delta, and South Fujian Delta, are also established. The impact of the opening policy on the eastern region is huge. Shenzhen is a classic example. Before imposing the opening-up policy, it is only a small fishing village. But after the implementation of the policy, Shenzhen has now become a first-tier city in China. The GDP rises from 196 million yuan to 2.24 trillion yuan over 1979 to 2017, with an average annual growth rate of 22.4%. In 2018, Shenzhen's GDP is 2.42 trillion yuan, an increase of 8% over the previous year, which ranks fifth in Asia after Tokyo, Shanghai, Beijing, and Seoul. The average annual growth rate of real GDP in the eastern region is 9.4% over 1958 to 2018. But this growth rate is 11.3% over 1978 to 2018. Obviously, the economy grows faster after opening. In 2017, the total value of imports and exports in the eastern region is \$3,37872 billion. 434.2 times higher than the level in 1978, which leads its proportion in the country to increase from 37.7% to 82.5%.

The north-eastern region refers to the four provinces of Heilongjiang, Jilin and Liaoning. The economic development in the Northeast is very slow, and the growth rate is lower than the national average. Chi (2019) points out 3 facts that can be used to explain why the economic development in Northeast China is slow. Firstly, the openness is at a low level. In 2017, the foreign trade dependence or the openness degree of the region is only about 50 percent in the national average. Its GDP accounts for about 6.7% of the country, and its total foreign trade is only about 3.3% of the total of the country. Secondly, the market opening process is lagging. Among the top 500 Chinese private enterprises in 2017, there are only 9 in this region, accounting for 1.8% in total. Finally, industrial openness is still at a low level. Northeastern region is an old industrial zone, and most of the enterprises are state-owned.

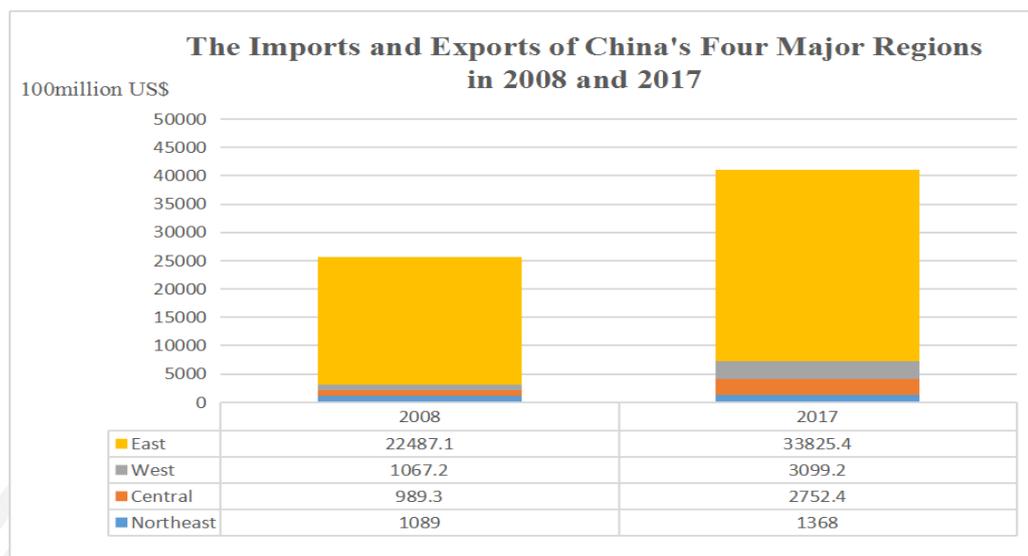


Figure 1.3 Import and Export of China in 2008 and 2017

Source:

[http://www.customs.gov.cn/customs/ztl86/302414/302415/zkdfc\\_fjxsd\\_hhqzgkf40zn/ggkf/2145303/index.html](http://www.customs.gov.cn/customs/ztl86/302414/302415/zkdfc_fjxsd_hhqzgkf40zn/ggkf/2145303/index.html) General Administration of Customs, 2018

### 1.3 Research Motivation and Objective

The reform and opening-up policies greatly promote China's economy. How does it promote the economy? Investment, an important component of GDP, drives economic development. Will openness promote economic development by affecting investment? In the 40 years of economic reform and opening-up, the foreign direct investment (FDI) of China has greatly increased. From 1983 to 1991, China's FDI increases from \$920 million to \$4.37 billion. From 1992 to 1997, China's foreign direct investment increases from \$11 billion to \$45.3 billion, implying an average growth rate of 32.7%. The World Investment Report 2019 shows FDI into China reaches 138.3 billion dollars, 151 times that of 1983, which accounts for more than 10% of the world's total. With the increase of openness level and the implementation of various policies to promote openness, will domestic investments in China also be affected? Will opening-up affect the total investment (both domestic and foreign) of China?

Many study results have shown that openness and investment are linked. Openness affects economic development by affecting investment. At present, there are lots of studies that focus on the connection between openness and economic growth in China. A few scholars examine the linkage of China's openness and foreign direct investment. At the best of my knowledge, no one has studied the relationship of China's openness and investment (domestic and foreign) using provincial panel data to study this relationship. This paper aims to fill this gap. Therefore, by studying the relationship of openness and investment, understanding its impact and consequences, and making recommendations are not only of great theoretical significance, but also of great importance in practice. In the context of China's reform and opening-up, this paper studies the relationship of openness and investment of China and also compares the difference between the western and the eastern regions.

The rest of this paper is organized as follows: the next section is the literature review. Section 3 proposes the research hypotheses and provides a brief discussion about the research models and research methodology. The empirical study results are presented in Section 4. The last section is a conclusion of the study and some policy recommendations.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Openness and Trade Openness

There is an ambiguity in distinguishing trade liberalization from openness which causes a serious problem for researchers. What should be used to describe openness is still uncertain (Yanikkaya, 2003). Different researchers hold different views on this issue.

The concept of openness is simply defined by Pritchett (1996) as economy's trade intensity. According to Belke and Wang (2005), there are two types of openness concept, including traditional openness and actual openness. Traditional openness means the share of trade as percentage of GDP. By adjusting the trade share, they introduce a new openness concept, called actual openness, that is the share of trade to the value-added that intra-regional trade generates. Squalli and Wilson (2011) believe that an open economy must make substantial contributions to world trade. Thus, they hold that the open economy should have the following characteristics. Firstly, foreign trade accounts for a relatively high proportion of all economic activities. Secondly, it maintains close ties with other countries and interplay with each other. But Mankiw (2008) holds that an open economy not only needs to interact with other economies in the world in the form of trade in goods and services, but also interact with the world's financial markets. Gräbner et al. (2018) believe that measures of openness can be categorized into 4 types based on 2 criteria: (a) focus on evaluating the economic outcome or legal framework over openness and (b) focus on the real flow or financial flow. In some literatures, however, the concepts of openness and trade openness are

confusing and ambiguous (Squalli & Wilson, 2011). Gries et al. (2009) employ the sum of export and import to real GDP in their research as a measure of openness. Chang and Chen (2007) investigate the interaction among FDI, economic growth, the degree of openness and unemployment in Taiwan. In their study, they use the total of foreign trade in good and service to GDP to denote the degrees of openness. However, Olufemi (2004) argues that there are broad and narrow concepts of openness. The broad one means the share of trade to GDP, and the narrow one refers to the share of total import or the share of total export to GDP. In many empirical studies, trade openness is often used as an indicator to express economic openness. In the above literatures, although they research the linkages of openness and other macroeconomic indicators, the openness in their papers just means trade openness, not include financial openness.

## **2.2 The Measure of Trade Openness**

The measures of openness are diverse (Squalli & Wilson, 2011). Nowadays, three popular and widely used methods to measure the degree of openness are the percentage of import to the gross domestic product, the percentage of export to the gross domestic product and the percentage of total trade to the gross domestic product. All the above three measures are used by Silajdzic and Mehic (2018) which study how trade openness affects economic development.

The share of total international trade to the gross domestic product is used in a wide range of topics and can be found in many empirical studies. It is also called trade share. Levine and Renelt (1992) study the connection between trade share and investment share. Goldfajn and Valdes (1999) and Alesina and Wacziarg (1998) both use the proportion of total international trade to GDP to represent openness in their research. In the research about trade openness and growth conducted by Dowrick and Golley (2004), they also use trade share as the indicator to refer to openness.

However, the use of these openness indicators also has some drawbacks. For example, the specific size bias is existing by using GDP as a reference point (Gräbner

et al., 2018). Fortunately, this issue can be addressed by adding two control variables, national territory and population, to control for country size in the regression (Lockwood, 2001; Vujakovic, 2009). Squalli and Wilson (2011) point out that the concept of trade openness is two-dimensional. Not only does it reflect the link between a country's trade and GDP, but also the connection and interaction between a country and other countries in the world. They prefer to integrate the two variables, trade share and world trade share into one variable to measure trade openness. Consequently, they propose this relatively complete method which is called Composite Trade Share. Regarding the issue of openness measurement, Alcalá and Ciccone (2004) put forward a different view. They argue that distortions exist because there are cross-border differences in the non-tradable goods' relative price. To eliminate these distortions, they propose two new methods to measure openness which are real openness and tradable GDP openness. Real openness refers to the share of the trade in exchange rate US\$ to GDP in purchasing-power-parity US\$ (PPP GDP). Tradable GDP openness means the ratio of the nominal international trade to the nominal value of production in the tradable good sector

Waugh and Ravikumar (2016) create a trade potential index to measure openness through standard multinational trade model. In this model, they use a country's potential well-being to measure openness level. The well-being is gained by entering the world without the trade friction. They hold that this measure of openness can reveal some information about underlying trade frictions. They use five indicators to measure openness in their study, including non-tariff barriers, average tariff rate, black market exchange rate, socialist economic and monopoly on major export. In particular, they believe all these five factors lessen the openness of a country. However, Rodriguez and Rodrik (2001) find that there are only two statistically significant variables out of the five by retesting Sachs and Warner's results: black market exchange rate and monopoly on major export. After further examining, they conclude that both of these two variables are not good measures for openness either and their ability to reflect the trade barrier is

unreliable and dubious. Leamer (1988) supports that trade barriers should be taken into consideration when measuring openness. He believes that tariff averages is not a good measure of openness. Because tariff averages cannot completely reflect openness. The restrictiveness of non-tariff barriers should be combined with the tariff averages. However, it is difficult to quantify tariff equivalents of non-tariff barriers. Thus, he conducts a research about the measure of trade barrier. He suggests that the difference between the “predicted” and the actual trade intensity ratios can be an indicator used to measure the trade barriers. However, he also points out that the usefulness of this indicator for measuring trade barriers is dubious. Gräbner et al. (2018) call tariff rate and other types of trade barriers are de-jure measures. They think that de-jure measures is a good measure of openness, but not widely used

### **2.3 The Theory of Investment**

Investment is defined as products purchased by individuals and companies to raise their future capital stock. Modern investment can be divided into three theories, namely Keynes investment theory, Neoclassical investment theory and Q theory of investment.

Keynes (1936) points out that the difference between the net marginal product of capital and interest rate determines the investment decision. When the difference value is positive, that is the net marginal product is greater than the rate of interest, investors have the incentive to invest more. The real return on capital is equal to the difference between marginal product of capital and depreciation rate. Marginal product of capital refers to the extra output that is expected to increase by adding one extra unit of capital. It decreases as the investment increases. According to Keynes, he believes that there are two reasons for this phenomenon. The first reason is that the prospective yield reduces when the supply of assets increases. Secondly, the price of the capital increases because of more production caused by more investment.

Neoclassical investment theory is developed by Jorgenson (1971b). It is the first theory to systematically study the determinants of investment volume. The optimal capital stock depends on output, price and the user cost of capital. This theory focuses on the capital goods output and user cost of capital.

Q theory is firstly proposed by Tobin (1969). But the rigorous model of this theory is established around the end of the 1970s and early 1980s and becomes the mainstream of investment theory (Wang, 2000). Tobin's  $q$  refers to the percentage of the market value of existing capital stock compared to its replacement costs. It is also called the Q ratio. According to Tobin, the net investment is determined by the value of  $q$ . If the value is greater than 1, investors can improve the market value of stocks by purchasing more capital. If the value is less than 1, investors should reduce their investment. Based on Tobin's Q investment theory, both current economic decisions and future economic decisions help determine investment decisions. As an indicator of investment, not only does it reflect the current profitability, but also reflects future profitability (see Mankiw, 2008).

## **2.4 Openness and Investment**

The relationship of openness and investment (both FDI and domestic investment) has been a heated debate in literature for many years. The theoretical relationship between openness and investment can date back to the 1930s. Heckscher and his student Ohlin propose the Heckscher-Ohlin model. In this model, international trade liberalization can enhance the return on investment in export-intensive countries, but it lowers the return in import-intensive countries. In the 1990s, however, some scholars' research outcomes show that openness contributes to improving the investment rate in many countries (Baldwin & Seghezza, 1996; Barro, 1991; Levine & Renelt, 1992). Levine and Renelt (1992) claim that trade may affect economic growth by affecting investment. In their research, the positive and robust relationship of investment and trade openness is found. According to the source of investment funds,

investment can be divided into foreign direct investment and domestic investment. Some scholars study the relationship of openness and total investment, while some scholars focus on the connection of openness and FDI or the connection of FDI and domestic investment.

By employing the cross-country data of Africa to conduct the investigation, Kandiero and Chitiga (2006) believe that the attractiveness for FDI flow into Africa can be increased by raising the openness degree. Sekkat and Veganzones-Varoudakis (2007) explore the factors affecting FDI inflow in developing countries. It is also found that a robust correlation of openness and FDI is existing. Openness positively and significantly affects FDI. The higher the degree of openness, the more FDI can be attracted. Liargovas and Skandalis (2012) suggest that the role of openness in attracting FDI cannot be underestimated based on the data of 36 developing countries over the period 1990 to 2008. However, Petrović-Ranđelović et al. (2017) find that the impact of openness on FDI is negative in six countries of the Western Balkans region based on the data over the time period of 2007 to 2015.

Bibi et al. (2012) provide an empirical study which searches for the determinants of domestic investment in Pakistan. In their study, the meaning of trade openness is the total foreign trade per rupee of GDP. They conclude that a long run relationship of openness and domestic investment is found. Trade openness is one of the decisive factors of domestic investment and has a significant and negative influence on domestic investment. Al-sadiq (2013) suggests that openness affects domestic investment negatively and significantly in his empirical study. Sala and Trivín (2014) provide an empirical investigation of factors affecting Sub-Saharan Africa's economic growth. The growth of globalization, foreign direct investment and domestic investment are the factors which are employed in the study. The evidence suggests that the degree of investment's impact, no matter of FDI or domestic investment on the economy is restricted by the degree of openness. They claim that it is important to combine the three elements to promote the development of economic, not just focus on one of them. Based

on the data from 1970 to 2015, Belloumi and Alshehry (2018) apply econometric techniques to confirm the causal link between domestic investment, FDI and economic development in Saudi Arabia. According to the empirical study result, they believe that trade openness can affect domestic investment in the long run. This effect is positive and significant.

Jones (2002) points out that in addition to the cost of the enterprise, the factors that determine the expected profitability of investment project are the degree of preference of the economic system for production rather than resource transfer, the size of the market and the stability of the economic environment. The degree of openness affects the size of the market and investment rate. The market for investment projects should not be limited by the domestic market. A bigger market implies a greater return on investment. If an economy has the following three characteristics which are the preference of institutional and legal for production over resource transfer, opening to international trade and global market competition and stable economic system, it can encourage the investment of fixed assets of domestic enterprises (plant and machinery) and the foreign investment. In the empirical test, he finds that those countries which have production-stimulating policies and high-level openness have a high investment rate.

Dowrick and Golley (2004) explore the relation of trade openness to economic development. In their study, they provide evidence that openness boosts economy and investment. On average, every 10% increase in openness will result in an increase in investment by 0.5%. Some benefits of openness are obtained by increasing investment.

Wadhawan and Kandiero (2003) empirically investigate the relationship of institutional quality, openness and investment in Africa. The study result reveals that there is a strong linkage between openness and investment. The coefficient of openness is 0.5. Openness can cause a positive influence on investment. But this influence is

limited by the quality of the institutions. Underdeveloped or malfunctioning institutions can reduce the total impact.

Al-Tarawneh and Al-Assaf (2014) examine the nexus of Jordan's openness and real investment based on the data from the period 1976 to 2010. By implementing OLS, the result indicates that there is no connection between real investment and openness in the long run. However, the ARDL estimation result shows that in the short-run, trade openness positively and robustly works on real investment. If trade openness increases one percent, the real investment can increase by 40 percent.

Karras (2006) estimates the impact of trade on the macroeconomic volatility by employing two data sets from 1951 to 1998 and 1960 to 1997. The research result reveals that the impacts of trade openness on output, consumption, investment and the exchange rate is negative and statistically significant.

Razin et al. (2002) suggest that the effect generated by trade openness can significantly work on investment. Investment costs change due to the opening economy. Trade openness has an impact on terms of trade, leading to a boom-bust investment cycle.

Harrison (1996) introduces different measures of openness to investigate the connection of openness and economic development. In the study, he extends to analyze the relevance of investment and openness (trade as a share of GDP). The result reveals that a connection exists between these two variables. This connection is positive and remarkable. However, it is unable to find the same relationship between investment share and other measures of openness.

Salahuddin and Islam (2008) apply econometric techniques (Fix effect model, Variance Inflation Factor test, Granger Causality test, and so on) to attempt to explore the factors affecting investment behavior. By studying 97 countries' data from 1973 to 2002, the empirical result reveals that trade openness can positively affect investment.

Baldwin and Seghezza (1996) point out that the effect caused by trade openness works on economic development only through investment. Their study result is consistent with Levine and Renelt (1992) finding. Trade openness plays a positive role in affecting investment. They believe that trade openness results in a lower investment cost by importing cheaper capital goods from abroad.

Rodrik (1997) estimates the Granger causal link of openness and investment, trade strategy, and export. In the study, openness is defined as the ratio of total foreign trade to GDP. The Granger causality test result indicates that investment Granger causes openness in both Korea and Taiwan. Such evidence is not found in Chile and Turkey. It is worth noting that there is also a causality, running from openness to investment in Taiwan.

Payne and Kumazawa (2005) employ three panel regression models to estimate the factors affecting investment in 29 sub-Saharan Africa countries. The empirical results from the three models suggest that opening has a boosting effect on investment.

Haq (2008) explores the causality direction and form of economic openness, investment and economic performance by adopting the data of Bangladesh from 1980 to 2006. The study result reveals that a one-way causality between investment and openness exists, running from openness to investment. Openness positively affects investment.

By employing the data of Syria during the period of 1980 to 2010, Mohsen (2015) adopts time series econometric techniques to investigate the impact of trade openness, GDP and population on the investment. According to the cointegration test result, the relationship between investment, trade openness, GDP and population is positive and robust. The test result clears that the two-way causal link between investment and trade openness, GDP and population respectively is found in the short run. There is also long-run unidirectional causal link, running from trade openness to investment.

Asfaw (2015) explores the relevance of trade policy and economic performance in Sub-Saharan Africa by using generalized least square (GLS). He finds that the way in which openness affects economic development is both direct and indirect. Openness works on the economy by affecting investment. In the estimation of openness and investment, the result shows that 10 percent increase in openness raises investment by 5.37 percent. The relationship of openness and investment is positive and robust.

Koşan and Apak (2015) estimate the impact of trade openness in OECD countries by applying the panel regression models. It is found that unemployment rate, investment freedom and gross domestic saving positively affect trade openness.

Domestic investment can also promote openness. Dutta et al. (2017) believe that a causal linkage between trade openness and domestic investment is found in the long run, running from domestic investment to trade openness. They hold that the impact of domestic investment on openness is positive.

## CHAPTER 3

### METHODOLOGY

#### 3.1 Data and Indicators

This study employs panel data from 2002 to 2017 of 30 provinces in China. As shown in Table 3.1, the data is obtained from China National Bureau of Statistics Database, World Bank Data website, CEIC Database, Thomson Reuters Database, China Statistical Yearbook and China each province's Statistical Yearbook. Because some data of Tibet is missing, it is not included. Although China has proposed the opening-up policy as early as 1978, it is not until the 1990s that all provinces implement this policy. Regarding the availability of the data, this study just employs the data series over the period of 2002 to 2017.

This paper aims to investigate the relationship of openness and investment in China. In addition, regional analysis on the west and the east is conducted. The data consists of 30 provinces including 11 provinces from the western region and 10 provinces from the eastern region. The western provinces are Shaanxi, Sichuan, Yunnan, Guizhou, Guangxi, Gansu, Qinghai, Ningxia, Xinjiang, Chongqing, Neimenggu. The eastern provinces are Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan.

In the analysis, the investment is decomposed into the foreign direct investment and the domestic investment. The foreign direct investment to provincial GDP ratio and the domestic investment to provincial GDP ratio are selected to be the dependent variables denoted as FDI and DOINV respectively.

For the openness, the trade volume to GDP ratio is widely accepted as a measure of openness. It has been used in a number of empirical studies (Alesina & Wacziarg,

1998; Dowrick & Golley, 2004; Levine & Renelt, 1992). So, this study adopts this ratio to denote each province's trade openness (OPENNESS).

In addition to the three variables mentioned above, there are four more variables included in the study which are shown in Table 3.2. The trade volume of each province is denominated in US dollars in the original data. However, GDP and domestic investment of each province are denominated in RMB. Thus, this paper converts all RMB-denominated indicators into US dollars at the annual exchange rate.

Table 3.1 Raw Data

<b>Variable Name</b>	<b>Source</b>
Foreign Direct Investment	Each province's Statistical Yearbook and CEIC Database
Domestic Investment	China National Bureau of Statistics Database
International Trade Volume	China National Bureau of Statistics Database
Spot Exchange Rate	Thomson Reuters Database
Forward exchange rate	Thomson Reuters Database
Nominal Interest Rate	World Bank Database
Consumer Price Index	China National Bureau of Statistics Database
Nominal GDP	China National Bureau of Statistics Database

Table 3.2 Indicators

Variable Name	Description	Notation
Foreign Direct Investment	Foreign Direct Investment as % of provincial GDP (%)	FDI
Domestic Investment	Gross Capital Formation as % of provincial GDP (%)	DOINV
Openness	The International trade volume as % of GDP (%)	OPENNESS
Expected Gain	The different between the forward exchange rate and spot exchange rate (CHN/USD)	EXG
Real Interest Rate	Nominal Interest Rate Subtract the annual percentage change in the consumer price index of each province. (%)	RIR
Nominal provincial GDP Growth rate	Nominal provincial GDP Growth rate (%)	GDPGR

### 3.2 Unit Root Test

If the variables are non-stationary, a spurious regression may occur. To avoid such a problem, it is necessary to test the unit root. If there is a unit root, that means the variable is non-stationary, vice versa. There are six different tests for unit root including LLC, IPS, Breitung, ADF-Fisher, PP-Fisher and Hadri. This paper adopts LLC and ADF-Fisher tests. Both tests are carried out under 3 different specifications to get the most reliable result.

### 3.3 Model Specification

According to previous empirical studies, openness affects both foreign direct investment but also domestic investment. When the economy has the tighter connection

to the world, more international investors are more attracted to invest in the country which results in higher foreign direct investment. On the other hand, an open economy brings more opportunities for domestic investors which stimulates them to increase investments. This paper offers the empirical investigation on how the openness plays a role over investment in China. In details, two hypotheses are empirically tested. Firstly, the openness positively affects foreign direct investment in China. Secondly, the openness positively affects domestic investment in China. In each hypotheses, the regression is run over three sample sets which is the all-province, the western-province, and the eastern-province data sets to understand the impact of openness on investment in more details.

Model of FDI:

H<sub>0</sub>: Openness affects foreign direct investment

H<sub>1</sub>: Openness does not affect foreign direct investment

$$FDI_{ijt} = \sum_{k=1}^K \beta_k OPENNESS_{ijt-k+1} + \sum_{k=1}^K \chi_k EXG_{ijt-k+1} + \sum_{k=1}^K \delta_k GDPGR_{ijt-k+1} + e_{ijt}$$

Model of domestic investment:

H<sub>0</sub>: Openness affects domestic investment

H<sub>1</sub>: Openness does not affect domestic investment

$$DOINV_{ijt} = \sum_{k=1}^K \gamma_k OPENNESS_{ijt-k+1} + \sum_{k=1}^K \nu_k RIR_{ijt-k+1} + \sum_{k=1}^K \theta_k GDPGR_{ijt-k+1} + \varepsilon_{ijt}$$

where i represents different provinces, j represents sample sets namely overall, eastern region, and the western region, and t is the year. k denotes the number of lag.

### 3.4 Regression Model

Before conducting the regression, the model should be determined. Hausman test is used to test whether a random effect model or a fixed effect model should be employed.

H<sub>0</sub>: The regression model is random effect model

H<sub>1</sub>: The regression model is not random effect model

If the null hypothesis is accepted, the random effect model should be selected and vice versa.

The fixed effect regression model is created as follows:

$$FDI_{ijt} = \sum_{k=1}^K \beta_k OPENNESS_{ijt-k+1} + \sum_{k=1}^K \chi_k EXG_{ijt-k+1} + \sum_{k=1}^K \delta_k GDPGR_{ijt-k+1} + e_{ijt}$$

$$DOINV_{ijt} = \sum_{k=1}^K \gamma_k OPENNESS_{ijt-k+1} + \sum_{k=1}^K \nu_k RIR_{ijt-k+1} + \sum_{k=1}^K \theta_k GDPGR_{ijt-k+1} + \varepsilon_{ijt}$$

where  $FDI_{ijt}$  and  $DOINV_{ijt}$  denotes explained variables; the explanatory variable are  $OPENNESS$ ,  $EXG$ ,  $RIR$  and  $GDPGR$ ;  $\beta$ ,  $\chi$ ,  $\delta$ ,  $\gamma$ ,  $\nu$ , and  $\theta$  denote  $K \times 1$  regression coefficient column vector;  $e_{ijt}$  and  $\varepsilon_{ijt}$  are error terms.

The random effect model refers to a model that lacks unobserved random factors of individual and time changes. The model assumes that there is no correlation between individual random errors, time random errors, and mixed random errors.

## CHAPTER 4

### EMPRICAL ANALYSIS

#### 4.1 Descriptive Statistics

The descriptive statistics of three of three sample set are listed in Table 4.1, Table 4.2 and Table 4.3.

Table 4.1 Descriptive Statistics of Overall Sample Set

Variables	Observations	Mean	Maximum	Minimum	Std. Dev.
DOINV	480	0.549009	1.484208	0.272376	0.171999
FDI	480	0.024075	0.146466	0.000387	0.02039
OPENNESS	480	0.329909	1.668507	0.048472	0.298716
RIR	480	4.538281	6.446	3.318	0.784537
GDPGR	480	0.140388	0.32274	-0.224009	0.06663
EXG	480	-0.105406	0.1446	-0.4778	0.200478

Table 4.1 shows that each variable has 480 observations in the overall sample set. The maximum value of DOINV and OPENNESS are 1.484208 and 1.668507 respectively. The domestic investment in this paper means gross capital formation as a percentage of GPP. Openness means international trade volume as a percentage of GPP. Both maximum values should be less than 1. But in the raw data, investment volume is greater GPP which means that some measure errors may exist in the data collection. For FDI, the maximum and minimum values are 0.146466 and 0.000387 respectively which

means there is a big gap in FDI between provinces. The maximum and minimum values of real interest rate in overall sample set are same with the values in the west and the east sample sets which are shown in Table 4.2 and Table 4.3. That's because every province uses the same real interest rate. The EXG is also the same for every province.

Table 4.2 Descriptive Statistics of West Sample Set

Variables	Observations	Mean	Maximum	Minimum	Std. Dev.
DOINV	176	0.655362	1.484208	0.334185	0.203239
FDI	176	0.009827	0.040118	0.000387	0.008493
OPENNESS	176	0.243618	0.299265	0.048472	0.056577
RIR	176	4.536489	6.424	3.324	0.784627
GDPGR	176	0.148642	0.32274	-0.112085	0.071378
EXG	176	-0.105406	0.1446	-0.4778	0.20084

As shown in Table 4.2, there are 176 observations of each variable in the west sample set. For FDI, the maximum and minimum values are 0.040118 and 0.000387 respectively which means there is also a big gap in FDI between provinces in the west. Its average value is 0.009827 which indicates there is still less FDI in the west comparing with the east. The average value of OPENNESS is 0.243618. According to Table 4.3, the average value of OPENNESS is 0.595219. Thus, it means that the western region is less open than the east.

Table 4.3 Descriptive Statistic of East Sample Set

Variables	Observations	Mean	Maximum	Minimum	Std. Dev.
DOINV	160	0.45662	0.708831	0.272376	0.092356
FDI	160	0.039096	0.146466	0.00683	0.0217
OPENNESS	160	0.595219	1.668507	0.093921	0.383005
RIR	160	4.5402	6.446	3.318	0.787963
GDPGR	160	0.136415	0.279139	0.013084	0.053232
EXG	160	-0.105406	0.1446	-0.4778	0.200898

Table 4.3 shows that the maximum and the mean value of DOINV are 0.708831 and 0.45662 which indicates that domestic investment is the main force driving economic development. The mean value of FDI is 0.039096 which is greater than the average the overall and the west.

## 4.2 Unit Root Test

This paper employs two methods to test the unit root for the variables, ADF-Fisher and LLC. The results are showed in the following Table 4.4.

Table 4.4 Unit Root Test

Test Type	Region*	Variable	I(0)		I(1)	
			Statistic	Prob.	Statistic	Prob.
ADF	C	DOINV	78.5328	0.0545		
	W	DOINV	16.062	0.8128	34.7866	0.0408
	E	DOINV	31.3738	0.0504		
	C	FDI	97.0397	0.0017		
	W	FDI	36.8271	0.0247		
	E	FDI	31.5359	0.0485		

Test Type	Region*	Variable	I(0)		I(1)		
			Statistic	Prob.	Statistic	Prob.	
ADF	C	OPENNESS	62.8951	0.0067			
	W	OPENNESS	0.97326	0.6147	5.23298	0.0731	
	E	OPENNESS	35.1791	0.0090			
	C	RIR	38.8407	0.9845	190.459	0.0000	
	W	RIR	16.8914	0.7693	69.8424	0.0000	
	E	RIR	15.1214	0.7694	63.506	0.0000	
	C	EXG	97.8221	0.0015			
	W	EXG	35.8681	0.0314			
	E	EXG	32.6074	0.0372			
	C	GDPGR	49.3605	0.8349	348.219	0.0000	
	W	GDPGR	21.905	0.4656	114.056	0.0000	
	E	GDPGR	14.3245	0.8137	135.625	0.0000	
	LLC	C	DOINV	-4.85308	0.0000		
		W	DOINV	-0.13814	0.4451	-2.0592	0.0197
		E	DOINV	-3.62855	0.0001		
C		FDI	-5.30596	0.0000			
W		FDI	-2.96424	0.0015			
E		FDI	-3.40803	0.0003			
C		OPENNESS	-4.78336	0.0000			
W		OPENNESS	-0.66062	0.2544	-19.9186	0.0000	
E		OPENNESS	-4.42031	0.0000			
C		RIR	-8.16226	0.0000	-14.6991	0.0000	
W		RIR	-0.7056	0.2402	-8.8994	0.0000	
E		RIR	-0.68568	0.2465	-8.4808	0.0000	
C		EXG	-7.31457	0.0000			
W		EXG	-4.42919	0.0000			
E		EXG	-4.22307	0.0000			

Test Type	Region*	Variable	I(0)		I(1)	
			Statistic	Prob.	Statistic	Prob.
LLC	C	GDPGR	-1.97992	0.0239	-22.2165	0.0000
	W	GDPGR	-0.90528	0.1827	-11.7952	0.0000
	E	GDPGR	-1.69647	0.0449	-15.2790	0.0000

\* C, W and E represent country, western region and eastern region respectively.

The unit root result in Table 4.4 shows that when the variables are run in level, most are stationary. Only a few variables accept the null hypothesis which means these variables are not stationary on I (0). According to the test result, OPENNESS of the western region is stationary on the first difference. The RIR and GDPGR of all sample sets are stationary on the first difference. Lastly, DOINV of the west is stationary on the first difference at 1% significance level.

### 4.3 Estimation Result

#### 4.3.1 Hausman Test

Hausman test is employed to determine which model is used in the regression. In this study, there are six models. Thus, there will be six regression models. The Hausman test results can be found in Table 4.5

Table 4.5 The Result of Hausman Test of FDI and DOIVN Model

Model	Sample Set	Prob.	Regression Model
FDI model	Overall sample set	0.3580	Random
	Overall sample set with Lagged	0.0000	Fixed
	West sample set	0.7472	Random
	West sample set with Lagged	1.0000	Random
	East sample set	0.4397	Random
	East sample set with Lagged	0.0000	Fixed

Model	Sample Set	Prob.	Regression Model
	Overall sample set	0.0113	Fixed
	Overall sample set with Lagged	0.0000	Fixed
DOINV model	West sample set	0.3770	Random
	West sample set with Lagged	0.0982	Fixed
	East sample set	0.4071	Random
	East sample set with Lagged	0.0004	Fixed

The Hausman test results show in Table 4.5 that the P-values of overall sample set with lagged and east sample set with lagged are less than 1%. It means that fixed models are preferred. The P-values of the rest regions are greater than 0.1 which means they accept the null hypothesis. Therefore, the variables should be run on the random model. In the domestic investment model of the overall sample set, the P-values are 0.0113 and 0.0000. Thus, it should be run on the fixed model. However, in the domestic investment model of the west and the east region with lagged, the results indicate that they reject the null hypothesis. Therefore, these two models should be run on the fixed effect regression model. The P-value of west and east sample sets are 0.3770 and 0.4071 respectively. They accept the null hypothesis and should be run on random model.

#### 4.4 Regression

According to the Hausman test, we know that the coefficients of the variables should be estimated by what kind of regression model. The regression results of openness and foreign direct investment in different regions are shown as follow:

Table 4.6 The Regression Result: FDI is dependent variable.

Variable	Overall		West		East	
C	0.0024 ***	0.0052 ***	0.0026 ***	0.0010 *	0.0117 ***	0.0180 ***
OPENNESS	-0.0022		-0.0076		-0.0006	0.0083 *
GDPGR	0.0187 **	0.0181 ***	0.0036		0.0007	
EXG	-0.0008		-0.0013	-0.0037 **	-0.0163 **	-0.0156 ***
OPENNESS (-1)	0.0033	0.0099 ***	0.0692	-0.0110	0.0036	
GDPGR(-1)	0.0089	0.0150 **	0.0067		-0.0225	
EXG(-1)	-0.0018		0.0002		0.0007	
FDI(-1)	0.7510 ***	0.6454 ***	0.8305	0.8592 ***	0.4733 ***	0.3084 ***
OPENNESS (-2)	-0.0005		0.1643 ***		0.0021	
GDPGR(-2)	0.0139 *	0.0164 ***	0.0001		0.0133	
EXG(-2)	0.0036		-0.0023		0.0067	
FDI(-2)	0.1444 ***		-0.1197 *		0.0722	

\*\*\* \*\* \* represent the significant level at 1%, 5% and 10% respectively.

After adding lagged, most of variables are not significant. It is necessary to cut them off. When cutting all non-significant variables off, the regression results are the best. In Table 4.6, the regression results illustrate that all variables in overall sample set are significant, where OPENNESS, FDI and GDPGR are significant at 1% significance level and the signs are in the expectation. EXG is not significant at any significance level. However, in the west sample set, only EXG and FDI are significant. OPENNESS and GDPGR are not significant. The regression result of openness and FDI of the

eastern region reveals that only the variables' P-values of OPENNESS and EXG are less than 0.1 which means they are significant. GDPGR is not significant.

The regression results of openness and domestic investment in different regions are shown as follow:

Table 4.7 The Regression Result: Domestic investment is dependent variable

Variable	Overall	West	East
C	0.0807 ***	0.0789 ***	0.0096 0.0072 0.0913 0.0854 *** ***
OPENNESS	0.0072	0.0060	- 1.3154 - 0.9881 - 0.0066 - 0.0017
GDPGR	- 0.1864 ***	- 0.1955 ***	- 0.1431 - 0.2239 - 0.0219 ***
RIR	- 0.0029		- 0.0050 0.0017
OPENNESS (-1)	- 0.0225		- 0.9298 - 0.0183
GDPGR(-1)	- 0.0955 **	- 0.0773 **	- 0.0513 0.0243
RIR(-1)	- 0.0004		- 0.0019 - 0.0031 - 0.0047 *
DOINV(-1)	1.2210 ***	1.2243 ***	0.2762 0.3674 1.0944 1.0441 *** *** *** ***
OPENNESS (-2)	0.0188		0.8562 0.0124
GDPGR(-2)	- 0.0246		0.0798 - 0.0260
RIR(-2)	0.0026		0.0060 0.0053
DOINV(-2)	- 0.3622 ***	- 0.3624 ***	- 0.0014 - 0.2727 - 0.2224 *** ***

\*\*\* \*\* \* represent the significant level at 1%, 5% and 10% respectively.

After adding lagged, most of variables are not significant. It is necessary to cut them off. Therefore, the result are shown in Table 4.7. The results in table reveal that in overall and west sample set, GDPGR is significant at 1% significant level. OPENNESS and RIR is not significant at any significant level. Even though GDPGR of the country and western region is significant, its sign is negative. The regression result of the east

sample set shows that both GDPGR and OPENNESS are non-significant after taking lagged. RIR is negative and significant.

## 4.5 Result and Discussion

### 4.5.1 Model of FDI

The regression results of the FDI model in Table 4.6 indicate that the coefficient of the OPENNESS in overall and east sample sets are 0.0099 and 0.0083 respectively. It means that they both have a positive effect on FDI in their own regions. Every percent increase in openness of China on average causes a 0.0099% increase in FDI in the next period. The openness of the eastern region positively affects foreign direct investment by 0.0083%. In other words, one percent increase in openness leads to 0.0083 percent increase in investment. These results are consistent with the estimation results of existing research. (Liargovas & Skandalis, 2012; Sekkat & Veganzones & Varoudakis, 2007). FDI in China is influenced by the openness level. A higher openness level attracts more FDI. China has a huge population which is a huge market for foreign investors. In addition, China has introduced some laws and regulations to protect the rights and interests of foreign investors. After opening, many preferential policies are also applied to promote FDI, such as tax, foreign exchange, price, and production and management preferences. These preferential policies greatly stimulate foreign investment. In 2002, the FDI value is 52.74 billion US dollars. But by 2018, the FDI value increases to 138.31 billion US dollars. An open economy can provide more opportunities for foreign investors. From 2000 to 2017, the total imports and exports of foreign direct investment enterprises nationwide amount to 22,332.88 billion U.S. dollars. It makes up about half of the country's total foreign trade. The cumulative exports are 120,66.78 billion U.S. dollars, representing 49.9% of the country's total. Therefore, for foreign investors, they prefer to raise investment in a more open economic environment.

The eastern region is China's first batch of regions to implement an opening policy. It has attracted many foreign investors. Due to the advantageous geographical location of the eastern region, the government gives priority to open it. Many economic zones are established. Meanwhile, the government gives many preferential policies to the provinces in the eastern region, such as the reduction of corporate income tax, the opening of financial services, etc. Therefore, the foreign trade of the eastern region develops rapidly which attracts more and more FDI.

However, it is worth noting that the openness of the western region does not have any impact on FDI. Because the west does not have enough western-friendly environment. The economy and education in the west are not developed well compared with the east, there is a lack of a good language surrounding. It is also difficult to meet the needs of foreign investors in diet. In addition, due to the relatively outdated infrastructure and the constraints of the ecological environment in the western region, the economy is less development. Although the government is promoting economic development in the western region and many preferential policies are putting into effect, their attractions to FDI is still insufficient; for example, underdeveloped transportation, high transportation costs, inadequate infrastructure, few English speakers, and few foreign foods. Thus, there is less FDI. Hu (2014) points out one of the characteristics of investment in the western region is that infrastructure investment is still the mainstay. It mainly relies on central government transfer payments. In 2017, the FDI value in the western region is 8.13 billion US dollars, it only accounts for 6.2% of the country's FDI value. Even though this proportion increases to 7.1% in 2018, it is still less than that of other regions. In 2018, the eastern region's FDI value takes 83.4% of the nation.

The coefficients of EXG in west and the east sample sets are -0.0032, and -0.0156 respectively. Thus, when EXG increases by 1%, the FDI in the western region and the eastern region will decrease by 0.0032% and 0.0156% respectively. The increase in the expected gain means currency devaluation. Therefore, for foreign investors, their

income will decrease. The coefficient of EXG of the overall sample set is not significant.

The positive coefficients of GDPGR in overall and the west sample sets suggest that there is a positive relationship between GDP growth rate, which proxies the economic boom, and FDI. GDP growth rate goes up one percent in China and the western region respectively, then the FDI goes up 0.0181%, 0.0048% respectively. These results have confirmed by Liargovas and Skandalis (2012), Sekkat and Veganzones-Varoudakis (2007) and Chakrabarti (2001). From 2002 to 2019, the GDP growth rate of the world is 2.89%. Over the same period, the average of GDP growth rate of China is 8.95%, much higher than the world average. Therefore, high GDP growth rate implies the booming economy and high expected profitability for investment projects. For the western region, GDPGR is also a crucial factor in promoting FDI. Although the GDP of the western provinces are low, the growth rates is very high. From 2013 to 2017, the average annual growth rate of GDP in the western region is 8.8%. The data reveals that the average annual growth rate of GDP per capita in the eastern, central, western, and northeastern regions is 7.2%, 8.2%, 8.5%, and 6.1%, respectively, from 2012 at constant prices. The average annual growth rate in the western region is the highest. But GDPGR does not influence FDI in the eastern region.

#### **4.5.2 Model of Domestic Investment**

The results in Table 4.7 illustrate that openness cannot stimulate domestic investment in China and the eastern region. That may due to most provinces, especially those in east region are opened for a long time. They are highly developed. Thus, there is less attraction for domestic investors to invest. The impact of openness in the western region on domestic investment is not significant. Hu (2014) points out that investment in this region is dominated by government investment. Although the growth rate of investment in the western region is higher than that of other regions in recent years, these investments are all related to government investment. Domestic private

investment is still less. Government investment is not affected by openness. That is why the effect openness on domestic investment is insignificant in the western region. The low domestic private investment rate in the western region is mainly the following reasons. Firstly, Backward infrastructure and underdeveloped logistics lead to higher transportation costs. Secondly, due to the weak industrial foundation and lack of complete industrial supporting facilities, enterprises are not willing to transfer investment from east to west. Thirdly, there is a lack of a high-quality workforce. Finally, a good business environment hasn't been formed.

The coefficients of RIR of the east sample set is -0.0056. It means that every percent increase in RIR causes a decrease in investment by 0.0056% in the eastern region. The effect caused by real interest rate on investment is negative. Because a rise in the real interest rate increases the cost of borrowing. Thus, investors reduce their investment. This result has confirmed by Malawi and Bader (2010). The domestic investment of China and the western region is not affected by real interest rate.

The positive coefficients of GDPGR in overall and the east sample sets suggest that GDP growth rate has negative effect on domestic investment in China and the western region. When GDP growth rate goes up one percent in the overall and the west sample sets respectively, the domestic investment goes down 0.1955%, and 0.2239% respectively. Most of investment in the west is public investment. When the GDP growth rate of the western provinces rises, people have more income and their well-being is improved. Thus, the need for government stimulus package is lessened and then government reduces the investment expenditure. The impact of GDP growth rate on domestic investment is not significant in eastern region. Because the economic of eastern region is highly developed. Investors will not make investment decisions based on the GDP growth rate.

## **CHAPTER 5**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 Conclusion**

The purpose of this study is to estimate the relationship of trade openness and investment in China covering the time period of 2002 to 2017. The study shows that openness positively affects FDI in China. In the east where the economy is more private sector driven, openness raises the profitability and opportunities for local investor. Moreover, openness directly and indirectly attracts FDI. With more trade linkage, it is easier for international investors to come to China and in turn gradually makes a living environment in China friendlier to foreigners. However, there is apparently no empirical support for the role of openness towards investment in the west. This can be explained by the fact that a big part of investment in the west is centralized by the government which is planned regardless of the level of openness.

#### **5.2 The Limitation of Study**

There may be some potential limitations in this empirical study.

First of all, due to the lack of data, the sample size is small. Thus, the results may be affected by the small size of the sample. The study sample size should be expanded in future studies.

Second, the trade in service is not included when measuring openness. Since this study is based on the provincial panel data, the data of service import and export is not available in all provinces. Therefore, this paper just employs the trade in goods to

GPP ratio to measure each province's degree of openness. In future studies, the export and import of services should be included if possible.

Third, due to unavailability of data, there is a lack of decomposition between the private and public investment.

### **5.3 Policy Implication and Recommendation**

The estimation results provide strong evidence that openness affects FDI positively and significantly in China. Openness is a crucial determinant of foreign direct investment. Openness can promote the foreign direct investment rate. However, the regression results of the sub-sample indicate that the impact of openness on investment in different regions is different. Openness has a positive and significant impact on investment in the eastern region, but its impact on investment in the western region is not significant. These differences may be caused by the different types of investment, the development level of infrastructure and related industries, and the business environment for investment. In addition, even though the opening policy is put into practice since the 1980s, only some cities are opened. For some provinces, the opening time is relatively short. That may be one of the reasons why the openness level of the provinces in inland is much lower than the eastern coastal provinces. Therefore, it is extremely important to improve openness to attract more investments. By the study results, this paper makes several recommendations as following:

Firstly, the government should actively promote the construction of pilot free trade zones, especially in the western regions. Because enterprises can enjoy preferential tariff policies in the zone. They can import, manufacture and re-export goods without customs intervention. Thus, it means that the cost of enterprises is lower and it is easier to trade with other countries. From the perspective of trade openness degree, China and the western region's openness is still at a low level and lower than the eastern region. Although there is no well-developed shipping in the western region, many provinces are adjacent to other countries. It is easier for those provinces to import

and export. Especially after the Belt and Road Initiative is proposed, the western region becomes the core economic region of the Silk Road Economic Belt. China develops trade partnerships with more and more countries. If the more zones are established, more and more import and export trade may occur, and the degree of openness will be improved. A higher openness level increases the investment rate and boost economic development.

Secondly, each province, especially the provinces in the western region, should take advantage of the opportunity of the “Belt and Road” initiative to actively trade with the countries along the route to expand the international market. In the past two decades, the Western Development Strategy has narrowed the development gap between the western region with other regions. People's living standards, infrastructure construction and industrial system construction have all been further improved, which laid a good foundation to open the economy. Therefore, it is time to make full use of the opportunity which brings from the Belt and Road Initiative to improve the level of economic opening.

Thirdly, speeding up the construction of transportation and other infrastructure. For some provinces, the first problem that needs to be solved to improve trade openness is transportation. For the provinces near the rivers, it should promote the construction of docks and ports which can transport bulk goods. For provinces that are not close to rivers, highways and railways should be actively constructed. The main transportation in inland provinces is railways, so it is necessary to strengthen the railway connection between inland provinces and coastal provinces. It is easier for the inland provinces to sell products to the international market by applying the model of railway plus ocean shipping. A perfect transportation system plays a vital role in accelerating trade openness.

Fourthly, the industrial structure should be upgraded. It helps to improve the competitiveness which promotes the export and increase the degree of openness. The government should encourage the development of capital and technology-intensive

industries. In the past, China is at the bottom of the global industrial chain. Enterprises mainly use the advantage of rich labor to process and produce numbers of products. Although in recent years, many companies have gradually realized the importance of the improvement of product quality and brand building, there is still much room for improvement. The government can encourage enterprises to improve R & D capabilities, product quality and production efficiency through subsidies.

Fifthly, Speeding up the cultivation of foreign trade and logistics talents. In recent years, cross-border e-commerce has gradually emerged. Comparing to traditional foreign trade, it requires foreign trade practitioners to have more capabilities. In addition, for economically underdeveloped regions, talent introduction policies should be introduced, especially in the foreign trade and logistics industry.

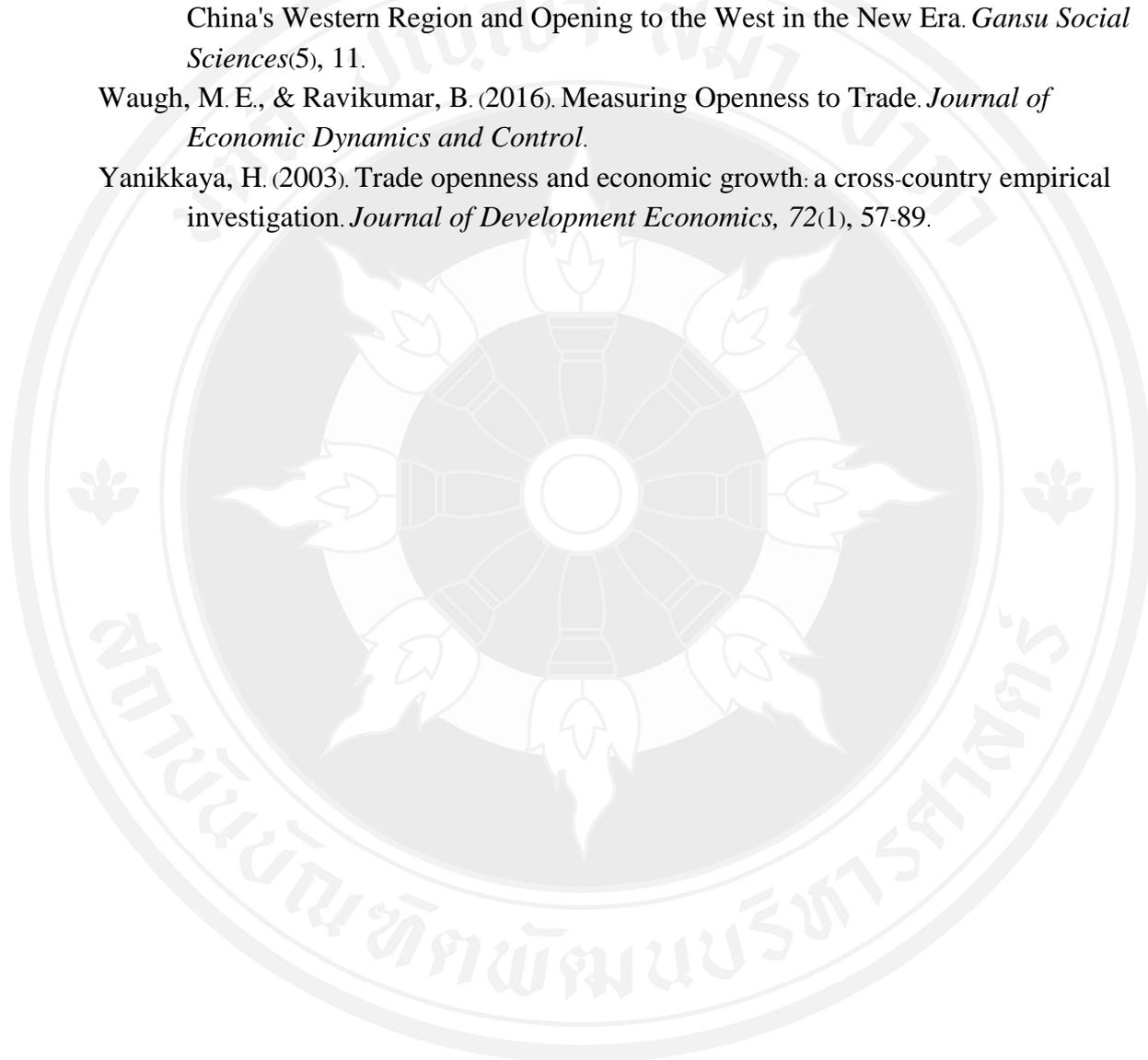
## BIBLIOGRAPHY

- Al-sadiq, M. A. J. (2013). *Outward foreign direct investment and domestic investment: The case of developing countries*: International Monetary Fund.
- Al-Tarawneh, A. A., & Al-Assaf, G. I. (2014). Trade openness and real investment in Jordan: An ARDL bound testing approach. *Jordan Journal of Economic Sciences*, 200(1074), 1-32.
- Alcalá, F., & Ciccone, A. (2004). Trade and productivity. *The Quarterly journal of economics*, 119(2), 613-646.
- Alesina, A., & Wacziarg, R. (1998). Openness, country size and government. *Journal of public Economics*, 69(3), 305-321.
- Asfaw, H. (2015). Trade policy and economic growth in Sub-Saharan Africa: A panel data approach. *American Journal of Trade Policy*, 2(1), 7-14.
- Baldwin, R. E., & Seghezza, E. (1996). *Trade-induced investment-led growth*. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/5582.html>
- Barro, R. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics*, 106(2), 407-443.
- Belke, A., & Wang, L. (2005). The Degree of Openness to Trade: Towards Value-Added Based Openness Measures. *Unpublished Manuscript, University of Hohenheim*.
- Belloumi, M., & Alshehry, A. (2018). The impacts of domestic and foreign direct investments on economic growth in Saudi Arabia. *Economies*, 6(1), 18.
- Bibi, S., Khan, U. A., & Bibi, A. (2012). DETERMINANTS OF INVESTMENT IN PAKISTAN. *Academic Research International*, 2(2), 517-524.
- Chakrabarti, A. (2001). The determinants of foreign direct investments: Sensitivity analyses of cross-country regressions. *kyklos*, 54(1), 89-114.
- Chang, & Chen, S. (2007). The interactions among foreign direct investment, economic growth, degree of openness and unemployment in Taiwan. *Applied Economics*, 39(13), 1647-1661.
- Chi, F. (2019). Forming New Driving Forces for Northeast Revitalization by Expanding Opening. *Economic daily*.
- Din, M.-U., Ghani, E., & Siddique, O. (2003). Openness and economic growth in Pakistan. *The Pakistan Development Review*, 42(4), 795-807.
- Dowrick, S., & Golley, J. (2004). Trade openness and growth: who benefits? *Oxford review of economic policy*, 20(1), 38-56.
- Dutta, C. B., Haider, M. Z., Das, D. K., & Finance, P. (2017). Dynamics of economic growth, investment and trade openness: Evidence from Bangladesh. *South Asian Journal of Macroeconomics*, 6(1), 82-104.
- Goldfajn, I., & Valdes, R. O. (1999). The aftermath of appreciations. *The Quarterly Journal of Economics*, 114(1), 229-262.

- Gräbner, C., Heimberger, P., Kapeller, J., & Springholz, F. (2018). *Measuring Economic Openness: A review of existing measures and empirical practices*. Retrieved from
- Gries, T., Kraft, M., & Meierrieks, D. (2009). Linkages between financial deepening, trade openness, and economic development: causality evidence from Sub-Saharan Africa. *World Development*, 37(12), 1849-1860.
- Haq, M. M. (2008). *Growth and openness: empirical evidence from Bangladesh*.
- Harrison, A. (1996). Openness and growth: A time-series, cross-country analysis for developing countries. *Journal of development Economics*, 48(2), 419-447.
- Hu, S. (2014). An Analysis of Investment Trends in the Western Region.
- Jones, C. I. (2002). *Introduction to Economic Growth*: Peking University Press.
- Jorgenson, D. W. (1971a). Econometric Studies of Investment Behavior: A Survey. *Journal of Economic Literature*, 9(4), 1111-1147.
- Jorgenson, D. W. (1971b). Econometric Studies of Investment Behavior: A Survey. *Journal of Economic Literature*, 9(4), 1111-1147.
- Kandiero, T., & Chitiga, M. (2006). Trade openness and foreign direct investment in Africa: economics. *South African Journal of Economic Management Sciences*, 9(3), 355-370.
- Karras, G. (2006). Trade openness, economic size, and macroeconomic volatility: Theory and empirical evidence. *Journal of Economic Integration*, 21(2), 254-272.
- Keynes, J. M. (1936). *The General Theory of Employment, Interest, and Money*
- Kim, D. H., Lin, S. C., & Suen, Y. B. (2011). Nonlinearity between trade openness and economic development. *Review of Development Economics*, 15(2), 279-292.
- Koşan, N. İ., & Apak, S. (2015). *Trade Openness and Macroeconomic Policy in OECD Countries*. Paper presented at the INTERNATIONAL CONFERENCE ON EURASIAN ECONOMIES
- Lal, A. K. (2017). Foreign direct investment, trade openness and GDP in China, India and Mexico. *The Singapore Economic Review*, 62(05), 1059-1076.
- Leamer, E. E. (1988). Measures of openness. In *Trade policy issues and empirical analysis* (pp. 145-204): University of Chicago Press.
- Levine, R., & Renelt, D. (1992). A sensitivity analysis of cross-country growth regressions. *The American economic review*, 942-963.
- Li, Q. (2019). Openness and China's Economic Development: Improving Distribution or Promoting Growth. *Exploring Economic Issues*(4), 10.
- Liargovas, P. G., & Skandalis, K. S. (2012). Foreign direct investment and trade openness: The case of developing economies. *Social indicators research*, 106(2), 323-331.
- Lockwood, B. (2001). *How Robust is the Foreign Policy/Kearney Index of Globalisation?*: University of Warwick Coventry.
- Malawi, A. I., & Bader, M. (2010). The impact of interest rate on investment in Jordan: a cointegration analysis. *Journal of King Abdulaziz University: Economics Administration*, 105(3055), 1-26.

- Mankiw, N. G. (2008). *Principles of Macroeconomics* South-Western
- Mohsen, A. S. (2015). The Relationship between Trade Openness and Investment in Syria. *Journal of Life Economics*, 2(2), 19-28.
- Olufemi, S. M. (2004). Trade openness and economic growth in Nigeria: Further evidence on the causality issue. *South African Journal of Economic Management Sciences*, 7(2), 299-315.
- Payne, J. E., & Kumazawa, R. (2005). Capital mobility, foreign aid, and openness: further panel data evidence from sub-Saharan Africa. *Journal of Economics Finance*, 29(1), 122-126.
- Petrović-Randelović, M., Janković-Milić, V., & Kostadinović, I. (2017). Market size as a determinant of the foreign direct investment inflows in the Western Balkans countries. *Facta Universitatis, Series: Economics Organization*, 093-104.
- Pritchett, L. (1996). Measuring outward orientation in LDCs: Can it be done? *Journal of Development Economics*, 49(2), 307-335.
- Quan, H. (2018). China's Opening-up and Its Practical Innovation in the 40 Years and Its New Development in The New Era. *World Economy Studies*, 295(9), 8.
- Razin, A., Sadka, E., & Coury, T. (2002). *Trade Openness and Investment Instability*. Retrieved from [https://www.researchgate.net/publication/4753685\\_Trade\\_Openness\\_and\\_Investment\\_Instability](https://www.researchgate.net/publication/4753685_Trade_Openness_and_Investment_Instability)
- Rodriguez, F., & Rodrik, D. (2001). Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence. *NBER Macroeconomics Annual 2000*, 15, 79.
- Rodrik, D. (1997). Trade strategy, investment and exports: another look at East Asia. *Pacific Economic Review*, 2(1), 1-24.
- Sachs, J. D., Warner, A., Åslund, A., & Fischer, S. (1995). Economic reform and the process of global integration. *Brookings papers on economic activity*, 1995(1), 1-118.
- Sala, H., & Trivín, P. (2014). Openness, investment and growth in sub-Saharan Africa. *Journal of African Economies*, 23(2), 257-289.
- Salahuddin, M., & Islam, M. R. (2008). Factors affecting investment in developing countries: A panel data study. *The Journal of Developing Areas*, 42(1), 21-37.
- Sayek, S. (2009). Foreign direct investment and inflation. *Southern Economic Journal*, 76(2), 419-443.
- Sekkat, K., & Veganzones-Varoudakis, M. A. (2007). Openness, investment climate, and FDI in developing countries. *J Review of Development Economics*, 11(4), 607-620.
- Silajdzic, S., & Mehic, E. (2018). Trade Openness and Economic Growth: Empirical Evidence from Transition Economies. In *Trade and Global Market: IntechOpen*.
- Squalli, J., & Wilson, K. (2011). A new measure of trade openness. *The World Economy*, 34(10), 1745-1770.
- Tobin, J. (1969). A General Equilibrium Approach To Monetary Theory. *Journal of Money, Credit and Banking*, 1(1), 15-29.

- Vujakovic, P. (2009). *How to measure globalisation? A new globalisation index (NGI)*. Retrieved from <https://ideas.repec.org/p/wfo/wpaper/y2009i343.html>
- Wadhawan, S., & Kandiero, T. (2003). Institutional quality, openness, and investment in Africa. *South African Journal of Economic Management Sciences*, 6(2), 346-368.
- Wang, D. (2000). Investment Theory and Its Latest Development in Modern Macroeconomics. *Economic Research*, 12, 54-65.
- Wang, H., & Zhang, Y. (2018). 40 years of reform and opening up: Development of China's Western Region and Opening to the West in the New Era. *Gansu Social Sciences*(5), 11.
- Waugh, M. E., & Ravikumar, B. (2016). Measuring Openness to Trade. *Journal of Economic Dynamics and Control*.
- Yanikkaya, H. (2003). Trade openness and economic growth: a cross-country empirical investigation. *Journal of Development Economics*, 72(1), 57-89.





## BIOGRAPHY

**NAME** Zhang Yanyun  
**ACADEMIC BACKGROUND** September 2014- Jun 2018: Hechi University Bachelor Degree  
August 2018-March2021: National Institute of Development Administration, Thailand Master Degree  
**EXPERIENCES** None

