Factors Influencing Trade Between China and Thailand---

Based on the coastal areas in eastern China

Miss Xinxin Li

An　Independent Study Submitted in Partial Fulfillment of the

Requirements

for the Degree of Master of Arts in Business and Managerial Economics

Field of Study of Business and Managerial Economics

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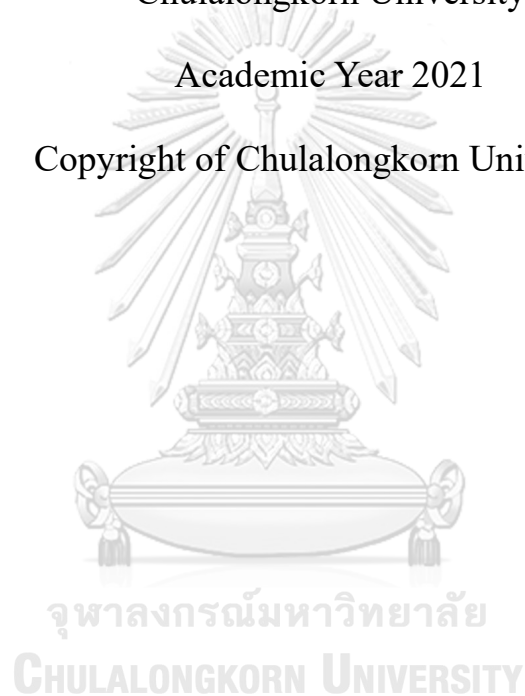
ปัจจัยที่มีอิทธิพลต่อการค้าระหว่างประเทศจีนและประเทศไทย—

อ้างอิงจากพื้นที่ชายฝั่งทะเลในแถบจีนตะวันออก

น.ส.ซินซิน หลี

สารนิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสต

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hailand---

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By   Miss Xinxin Li

Field of Study   Business and Managerial Economics

Thesis Advisor   Lecturer Doctor. DOUNGDAO MAHAKITSIRI

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University in Partial Fulfillment of the Requirement for the Master of

Arts

INDEPENDENT STUDY COMMITTEE

-- Chairman

(Assistant Professor SAN SAMPATTAVANIJA,

Ph.D.)

-- Advisor

(Lecturer Doctor. DOUNGDAO

MAHAKITSIRI)

-- Examiner

(Assistant Professor NIPIT WONGPUNYA,

Ph.D.)

ซินซิน หลี :

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(Factors Influencing Trade Between China and Thailand---

Based on the coastal areas in eastern China) อ.ที่ปรึกษาหลัก :

ดวงดาว มหากิจศิริ

อย่างที่เราทราบกันดีว่าจีนและไทยสถาปนาความสัมพันธ์ทางการฑูตใน ปี 2518 แล้ว แนวคิด "จีน-ไทย เป็นพี่น้องกัน" ได้ฝังรากลึกในหัวใจของคนทั้งสอง ดังนั้นโดยการเปรียบเทียบข้อมูลการค้านำเข้าและส่งออกระหว่างจังหวัดต่างๆ ในประเทศจีน และประเทศไทยในปี 2020 บทความนี้จะเลือกข้อมูลการค้าทวิภาคีระหว่าง 5 จังหวัดชายฝั่งทะเลอันดับต้นๆ กับประเทศไทยเพื่อการวิเคราะห์ เพื่อสำรวจปัจจัยที่ส่งผลต่อการค้าทวิภาคีระหว่างสองประเทศ นอกจากนี้ งานวิจัยนี้ได้นำแบบจำลองผลกระทบคงที่มาวิเคราะห์การถดถอย จากผลการวิเคราะห์ การศึกษาครั้งนี้ได้ให้ข้อเสนอแนะที่เกี่ยวข้องในระดับภูมิภาคและระดับประเทศ เพื่อตรวจสอบวิธีการมีส่วนร่วมในการพัฒนาการค้าทวิภาคีจีน-ไทยให้ดีขึ้น

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Factors Influencing Trade Between China and Thailand---

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As we all know, China and Thailand establish the diplomatic relations in 1975, then the concept of "Chinese and Thais are brothers" has been rooted in the hearts of the two peoples So through comparing the import and export trade data between various provinces in China and Thailand in 2020, this paper selects the bilateral trade data between the top five coastal provinces and Thailand for analysis, in order to explore the factors affect the bilateral trade between the two countries. Furthermore, this research applied the Fixed Effect Model to do the regression analysis. Based on the analysis results, this study gives relevant suggestions at the regional and national levels to investigate how to better make the contribution on the China-Thailand bilateral trade development.

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Xinxin   Li

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1. Introduction

In 1975, China and Thailand formally established friendly diplomatic relations, until today is the 47th anniversary, but actually, the bilateral trade volume that year was 24.62 million dollars, accounting for only 0.45% of Thailand's total foreign trade. However, after entering the 21st century, China and Thailand have gradually become two important emerging economies in Asia, with the strengthening of global and regional economic integration, CAFTA has been established and the free trade area has been continuously refreshed and upgraded, the bilateral trade between China and Thailand has developed rapidly, taking the trade data in 2020 as an example--- USD 98,624 millions, it has increased by more than 4,000 times, which demonstrates that the two countries have a close relationship in political, economic, cultural and other fields, and have established a comprehensive strategic partnership of cooperation.

Moreover, China and Thailand are both the important member of WTO, APEC, CAFTA and other international organizations, playing an significant role in various bilateral and multilateral cooperation. Especially in 2013, China proposed "The Belt and Road Initiative", which was widely supported by countries along the route, and then Thailand proposed the "Twenty-Year National Strategy" in 2018, these all display the efforts of the two governments to promote the national economic development. On the other hand, by 2010, China had replaced the United States as Thailand's largest export market, and then become the second largest source of imports and the second largest trading partner. Especially in 2011, Thailand surpassed Singapore to become the second largest trading country between China and ASEAN countries. Apparently, these relevant achievement all exhibit that international trade has played a vital part in the economic development of both countries. Therefore, it becomes more important to analyze the influencing factors of China-Thailand export and import trade.

However, China is vast in territory, it covers the land area of about 9.6 million square kilometers and the sea area of roughly 4.7 million square kilometers, so China is divided into 34 provinces. Therefore, the analysis of China as a whole is not accurate enough. It should be subdivided into different provinces, by analyzing the trade between different provinces and Thailand, we can get more accurate influencing factors.

In recent years, Chinese provinces have actively participated in the construction of the "the Belt and Road" policy, and it has promoted economic and trade cooperation with countries along the route. However, the regional differences exist in the effectiveness of cooperation among different provinces, so this research collect the import and export trade data between 31 Chinese various provinces and Thailand from 2010 to 2020, and after simply comparing and ranking the data in 2020, as shown in Figure 1, the results showed that Guangdong, Jiangsu, Zhejiang, Shanghai, and Shandong are the top 5 provinces which have the most trade with Thailand, and interestingly, they are all coastal areas in eastern China.
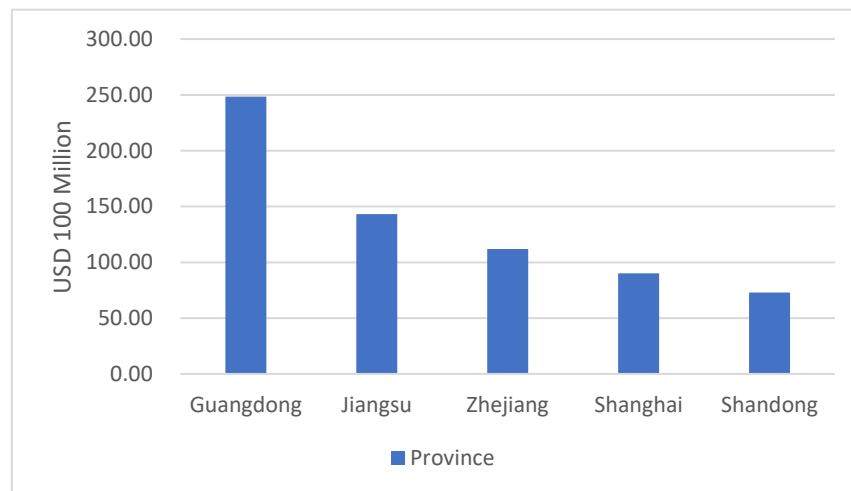
Figure 1. Top Five Provinces in Trade Volume with Thailand in 2020
Source: Chinese Development Research Center of the State Council Database

Therefore, this study will focus on the analysis of the main factors that affect the trade between these top five provinces and Thailand. It is not only helpful to improving resource allocation and promoting industrial upgrading, thereby enhancing the international competitiveness of the two countries, but also conducive to understanding the consumption demand and development trend of China-Thailand trade, further clarifying the focus of China and Thailand cooperation in the future, and promoting the economic, political and cultural prosperity and development of the two countries.

2. Literature review and basic theory

2.1 The factors of GDP

As we all know, Gross Domestic Product represents the market value of all finished goods and services produced by a country or region in a given period. Several studies in the last decade have considered the effect of GDP on the international trade. For example, according to Durkin, Jr. and Krygier (2000), they used the data from bilateral trade between the US and other OECD countries to study the effect of GDP per capital on the intra-industry trade, and then drawn a conclusion that there is positive and important relationship between the GDP per capita and the value of vertically differentiated intra-industry trade. Similarly, De Groot, Linders and Rietveld (2005) applied the gravity model of bilateral trade to test the impact of GDP per capital, clearly, the results illustrated that income per capital has a strong and active effect on bilateral trade whether it is OECD countries or non-members.

In addition, other scholars have also studied the factors that affect Chinese foreign trade, for example, Gao (2016) did a research about the determinants influencing Chinese exports trade, and confirmed that GDP and commodity structure are important parts that affect the total export volume, then he further explained that GDP growth greatly increases technological productivity, which expands the level and category of exported goods, stimulates foreign demand for domestic

goods, and thus increases total exports. Moreover, Yin and Yu (2021) used the multiple linear regression model to estimate the factors that affect the export of Chinese electrical and mechanical commodities to the Thailand market, and they found that actual gross national product of the importing country and the difference between the income levels of the residents of the two countries have the greatest impact on the Chinese mechanical and electrical exports to Thai market.

However, many studies, alternatively, taking specific provinces as examples for empirical research. For instance, Yu (2022) applied the five economic indicators of Jiangsu Province as the research sample to analyze the macroeconomic factors that affect its import and export trade, and the results showed that the regional GDP is the crucial element, he also found that when the regional GDP rises by 1%, the total foreign trade of Jiangsu Province will increase by 1.3%. Similarly, According to Xu, Liu and Zheng (2017), the GDP index as well has a major impact on the total trade volume of Zhanjiang, which is a port city and locate in Guangdong Province. And another research from Xu (2010) analyze the influential factors of agriculture industry by comparing the data from Shandong, Guangdong and Zhejiang, finally lead to the conclusion: the overall economic development level represented by GDP promotes the trade of agricultural products in these three provinces. Exactly speaking, GDP has the greatest influence on Shandong and has laid a solid foundation for its import and export trade of agricultural commodities, however, unlike the situation in Shandong, this driving effect in Guangdong and Zhejiang is mainly manifested in that GDP has increased the demand for agricultural imports ather than a boost to exports, because these two places are export-oriented economic provinces dominated by industrial manufacturing.

2.2 The effect of factor endowments

In 1919, the economists Heckscher and Ohlin in Swedish first proposed the Factor Endowment Theory, in which production factors mainly include land, labor, capital and entrepreneurship. Briefly speaking, this theory holds that labor-abundant countries should export labor-based commodities and exchange the capital-intensive items from the imports, and similarly, the capital-rich countries should export capital-based goods and import labor-intensive commodities that are relatively scarce. And many scholars have studied the impact of a country's factor endowment on its foreign trade. Meephokee, Cholpaisal, Roopsom and Intanuphat (2011) did a research about the factors affecting trade between Thailand and the Laos and found that, there were plentiful natural resources like the copper mineral and timber in Laos, and the other advantage is the topography in there is not affected by natural disasters such as tsunamis, these two strengthens all greatly facilitate the trade between both countries. Similarly, from a study of factors affecting bilateral trade flows in agriculture and clothing in 70 countries, the empirical results indicated that comparative advantage has a strong impact on the trade patterns. Specifically, a parameter called "land-to-labor ratio" was positively significant in the agricultural industry, while it was negatively

significant for labor-intensive clothing, therefore, this conclusion supporting the Heckscher-Ohlin theory, which is relative factor endowments motivate cross-border trade (Vollrath, Gehlhar and Hallahan 2008). Furthermore, Lu and Lian (2011) collected the data from Chinese 31 provinces to estimate the influencing factors of export trade, and they found that both capital stock and human capital are significant at the 1% level, which means that these two determinants play an important role in boosting Chinese export trade, and it should be noted that human capital has a more significant effect on stimulating exports.

At the same time, Zhu and Li (2011) did a research about the states of agricultural goods in China and five countries from Central Asia, then the results illustrated that because of the differences in capital, technology and land resources between the two countries, Chinese agricultural goods exports to these countries are mainly processed agricultural products based on capital and technology, and then import land-intensive primary agricultural products from other countries.

Then other existing research explained that indices that affect import and export trade, such as foreign direct investment and foreign engineering or labor cooperation, are affected by different factor endowments. For example, Kogut and Chang (1991) figured out that the direct investment of United States from Japanese enterprises are basically concentrated in technology-intensive products, and their investment motivation is obviously to purchase and share American production technology. Then according to Yin, Sheng and Wu (2019), the factor endowment of countries along the route of "Belt and Road" has a profound influence on foreign business, cooperation and location selection between China and these countries, exactly speaking, Chinese enterprises are more willing to conduct economic and trade exchanges with countries rich in natural resources, and China is more likely to invest in countries with rich labor resources. Like wise, a study from Cai, Shao and He (2013) suggested that Chinese overseas project contracting tended to cooperate with the countries which have abundant resources, briefly speaking, through helping the host country to build and improve its infrastructure projects such as bridges, roads, railways, hospitals and schools to facilitate the local economic development, so as to obtain rich local natural resources, such as some natural gas, base metals, gasoline, etc.

2.3 The factors of Foreign Direct Investment

The foreign direct investment (FDI) has become the main form of international capital flow since the 1980s. FDI not only makes up for the shortage of construction funds in the host country, also plays a key role in boosting the country's economic growth, such as accelerating industrialization, introducing advanced technology and management talents, increasing taxes, creating job opportunities and so on. An article published in American Economic Review by Mundell (1957) revised the H-O theory, relaxed the assumption that the factors in the H-O theory were immobile, and believed that international trade and international capital flow were mutually substitutes. In addition, Clausing (2000) used data from 1977 to 1994 to verify two relationships, one is between U.S. investment in 29 countries and U.S. exports, another one is between 29 countries' direct

investment in the U.S. and U.S. imports. The study results showed that a strong complementary relationship exists in the US foreign direct investment and US exports,, as well as for the positive effect of FDI in the United States on US imports. Similarly, in a research about the impact of European Monetary Union expansion on trade and FDI, the authors used the data of 29 countries' bilateral trade flows and the contributions of outward FDI stocks among these regions, then it has been found that " some of the trade effects arise from higher FDI stocks as our empirical results support the hypothesis of a positive correlation between trade and FDI" (Jelle, Richard and Marie, 2007, I24).

Then according to Wang, Wei and Liu (2010), they applied the gravity panel data models and found that many powerful determinants exist in the trade flow among 19 OECD countries in the period 1980-1998, they are market size, domestic R&D stock and FDI stock respectively, which means that there is a strongly positive relationship between these factors and the volume of bilateral trade. Moreover, some scholars have also studied the influence of FDI on Chinese import and export trade, for example, the empirical results of Lian and Li(2008) and Zhao (2014) all suggested that: FDI directly boost the development of Chinese international trade. The former also concluded that the promotion effect on the exports is significant and lasting, it means that FDI has obvious export-oriented characteristics in China, while the latter further indicated that FDI accelerate exports trade significantly more than imports trade. And moreover, many researchers analyzed the influence of FDI on different regions from China, for example, one study utilized the Chinese provincial-level data to estimate the influence of FDI for regional export trade, then Sun (2001) found that the impact of FDI on Chinese exports differing from three macro-regions, and the effect of coastal areas is stronger than the inland areas. On the other hand, Zhang (2017) gathered foreign trade volume and FDI data of 11 provinces along the Chinese Yangtze River to exploit the regional differences and influencing factors, and then drawn a conclusion that: for every 1% grown in foreign direct investment in these provinces , the international trade scale and quality increased by 0.49 and 0.21 percentage points respectively, besides, the international trade between provinces in the Yangtze River Economic Belt has obvious geographical agglomeration effect.

2.4 The other provincial factors

In addition to the above three common factors that affect foreign trade, according to the differences in the actual situation of each province, some studies have found other factors that affect the provincial foreign trade. For example, according to Yang, He and Jiang (2010), the driving effect of the industrial structure is an essential factor that affecting the processing trade in Shandong Province, specifically, for every 1% rise in the proportion of the secondary industry in GDP, the value-added rate of Shandong's processing trade increases by 2.6085%, at the same time, Shandong's long-term accumulation of a solid industrial base, the development of the manufacturing industry and the improvement of supporting facilities have played a powerful role

in accelerating the upgrading of processing trade. On the one hand, Ma, Cao and Li (2021) did a provincial analysis to estimate the impact of the level of logistics development on Chinese international trade, and then found that there is an active relationship between the logistics development level and the international trade, besides that, compared with other countries, the level of provincial logistics development in China took on a greater impact on bilateral trade. On the other hand, many scholars have also done another research on Chinese international trade in knowledge-based services. Zhang, Fu and Zhou (2016) collected the export value of tourism service trade and the export volume of transportation service trade in 20 provinces, and then drawn a conclusion that: human capital is the key factor on the export of knowledge-based service trade, which means that the government will need to introduce a large number of skilled talents into the service industry in the future, so the government expenditures are essential for the service trade. Like wise, Dong (2008) analyzed the impact of the differences in the comprehensive level of human capital in Zhejiang Province on regional economic and technological progress. The results demonstrated that the degree of human capital has a major impact on the level of regional economic development, exactly speaking, at a significant level of 1%, the higher level of human capital will result in a greater effect on the economic growth, and moreover, the labor productivity was also significantly driven by human capital.

3. Data description

3.1 Dependent variables

As shown in the introduction, in order to study the influencing factors on the trade of China-Thailand, this paper further collects trade data between all provinces in China and Thailand from the "Chinese Development Research Center Of The State Council Database". And after a simple ranking of import and export volume (USD Million) in 2020, it is concluded that trade in the eastern coastal areas of China is the most developed, so this study chose the import and export data of five coastal provinces and Thailand over the period 2010 to 2020, both of which are dependent variables.

3.2 Independent variables

And then this study is mainly based on the above theory and considering the current situation to analyzes the influencing factors from the following main parameters:

1) Gross Domestic Product (GDP). As we all know, GDP reflects the total economic scale of a country and represents the demand capacity of a country, but this research focus on the factors affecting the trade between the coastal areas in eastern China and Thailand, so regional GDP also

has the same function. The gross domestic product is one of the important indicators to measure the level of economic development, which is equal to the sum of the value added of each industry. The development of import and export trade basically depends on the level of regional economic development. The rapid growth of the national economy in coastal areas has driven the development of import and export trade to a certain extent. Therefore, the GDP from China and Thailand are one of the important factors affecting the total international trade in these five provinces.

2) Factor endowments. China is a developing country with a large population. As mentioned in the previous literature review, cheap and abundant labor resources driving the rapid growth of foreign trade in developing countries. Moreover, Chinese export trade relies on labor-intensive products and low labor costs, the advantages have occupied a certain market internationally. But can this advantage of labor force play a significant role in China-Thailand trade? If this labor advantage can continue, it will undoubtedly increase competitiveness of the Chinese economy, especially foreign trade. So this research collected the relevant data from the China Labour Statistical Yearbook. Additionally, with the development of technology, international trade is increasingly transformed into a new field dominated by knowledge and technology. Therefore, the human capital factor is also playing the more and more strong power, thus, this study want to estimate its influencing in China-Thailand trade. However, in the existing literature about human capital stock measurement, there are three main methods for measuring human capital. The first one is the income method; the second one is the cost method, and the third one is education index method, but the first two methods are more difficult to calculate in practice. Therefore, this paper uses the last method, that is, using the average education level of the labor force to measure the human capital stock, which is the most used method in empirical research.

First of all, according to the "China Labor Statistics Yearbook", this research further sets the years of education at different stages as follows: illiterate (0 year), elementary school (6 years), junior high school (9 years), high school or secondary vocational school (12 years), college (15 years), undergraduate (16 years), graduate (19 years). Secondly, this study applied the model:

$$\mu_t = \sum_{i=0}^{6} m_{a_i} \cdot p_{a_i}$$

Then m_{a_i} represents the number of years of education received by the employed persons who obtained the a_i degree, and p_{a_i} shows the proportion of the employed persons who obtained the a_i degree to the total number of labor force. Finally, it can be seen from the Figure 2 through collecting the number of employed persons and the education level of employees in these five coastal areas from 2010 to 2020. In the past ten years, basically all employed persons in these coastal areas have finished junior middle school (9 years). Among them, Shanghai has the highest education level, and almost all have completed junior high school education. In the employment situation of Guangdong, Jiangsu and Zhejiang provinces, the education level and development trend of the labor force are generally similar, but it is worth noting that the educational situation of employed people in Shandong province has generally shown a slight downward trend since 2014.
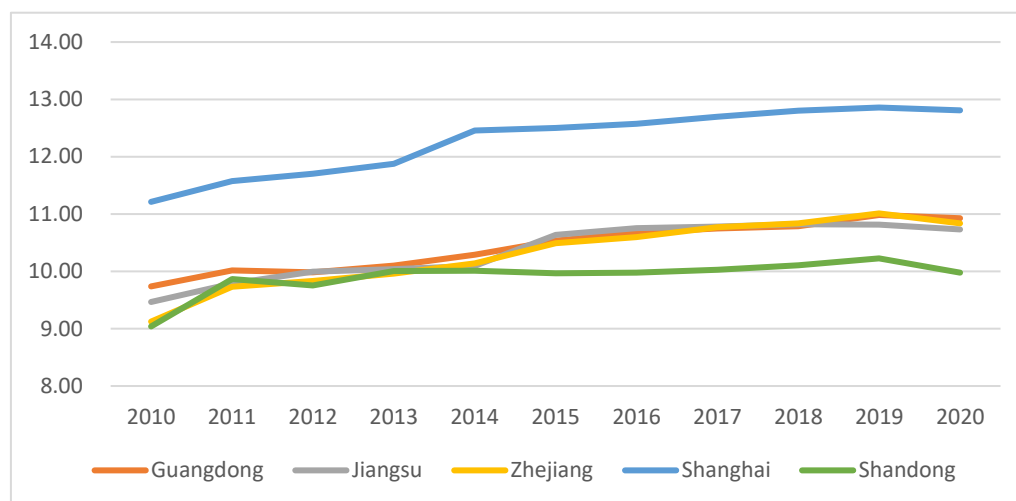
Figure 2. The Trend of Human Capital in the 5 provinces

Source: China Labour Statistical Yearbook

Therefore, this paper use two parameters to explain the effects of factor endowments on trade, they are Labor Force (10,000 Person) and Human Capital (Year) respectively.

3) Foreign Direct Investment (FDI). It often uses multinational companies as a carrier to provide commodities for the international market based on resource endowments with comparative advantages such as domestic cheap labor resources; and with the transfer of foreign advanced technology, equipment, and management experience, it is improving the international competition of export products. At the same time, it also avoids the trade barriers caused by the flow of factors of global economic integration, Therefore, IFDI (foreign direct investment in each province) and OFDI (outward foreign investment from each province) data should be considered in the model.

In addition, this study summarize the above variables and data sources in the Table 1.

Table 1. Data Description

Dependent variables	Ex	Export	Chinese Development Research Center of the State Council Database
	Im	Import	
Independent variables	GDP_C	Regional GDP from China	Chinese National Bureau of Statistics
	GDP_T	GDP of Thailand	World Bank
	LF	Labor force	China Labour Statistical Yearbook
	HC	Human Capital	
	IFDI	Inward Foreign Direct Investment	Chinese National Bureau of Statistics
	OFDI	Outward Foreign Direct Investment	

And because most variables cannot have identical units and the values of some variables are too large, for the purpose of avoiding the unstable impact of abnormal fluctuations of variables on the

model, it is necessary to take natural logarithmic form for all variables. Then as shown in Table 2, the Summary Statistics was performed on all variables and it can be seen that the statistical range of each variable is reasonable.

Table 2. Summary Statistics

Variables	N	Mean	Standard Deviation	Minimum	Median	Maximum
lnEx	55	3.7911	0.5268	2.6431	3.6875	4.7179
lnIm	55	3.9674	0.6234	2.6157	3.9753	5.0297
$lnGDP_C$	55	10.8023	0.5314	8.9635	10.8978	11.6151
$lnGDP_T$	55	8.3633	0.1413	8.1348	8.3269	8.6017
lnLF	55	8.2819	0.6036	6.9946	8.4677	8.8749
lnHC	55	2.3622	0.0874	2.2015	2.3549	2.5540
lnIFDI	55	5.3668	0.4151	4.5183	5.3844	6.3792
lnOFDI	55	14.9495	1.0919	12.8709	15.0461	16.9415

4. Empirical study and results

This research applied the panel data to do the regression analysis, and for the purpose of studying the factors affecting import and export trade more concretely, this paper will conduct regression analysis on exports and imports respectively. So this estimation approach can be summarized in the following equation:

$$ln\,Ex_{it} = C + \beta_1\,lnGDP_{Cit} + \beta_2 lnGDP_{Tit} + \beta_3\,lnLF_{it} + \beta_4\,lnHC_{it} + \beta_5\,lnIFDI_{it} + \beta_6\,ln\,OFDI_{it} + \epsilon_{it} \quad (1)$$

$$ln\,Im_{it} = C + \beta_1\,lnGDP_{Cit} + \beta_2 lnGDP_{Tit} + \beta_3\,lnLF_{it} + \beta_4\,lnHC_{it} + \beta_5\,lnIFDI_{it} + \beta_6\,ln\,OFDI_{it} + \epsilon_{it} \quad (2)$$

Where i=1, 2, 3, 4, 5, representing Guangdong, Jiangsu, Zhejiang, Shanghai and Shandong respectively, and the range of t is 2010 to 2020. Then the α, β_1, β_2, β_3, β_4, β_5 and β_6 are regression coefficients, and ϵ_{it} is the error term. In general, the mixed-effects, fixed-effects, and random-effects models are three major types of models to analyze the panel data. Therefore, it is crucial to decide which model need to be applied before starting the empirical regression.

Table 3. Test Results of Regression Model Selection

3-A. F-test	
lnEx	lnIm
F(4,45)=139.98	F(4,45)=77.18
Prob>F=0.0000	Prob>F=0.0000

3-B. Hausman Test	
lnEx	lnIm
chi2(4)=45.35	chi2(4)=42.77
Prob>chi2=0.0000	Prob>chi2=0.0000

This paper firstly applied the sample data to do the F-test, and it can be seen that the p-values of the F test both are 0 in Table 3-A, so it rejects the null hypothesis, that is, the fixed-effects model is more appropriate than the mixed-effects model. Secondly, the Hausman Test is carried out to judge whether to use a fixed-effects model or a random-effects model, then the p-values are both 0 which shown in Table 3-B, indicating that this study should choose the fixed-effects model to do the regression analysis.

In addition, this research used the Pearson and Spearman coefficient, which is not only initially judge the correlation degree between the variables, also can estimate if it exists an obvious multicollinearity problem between variables. In Table 4, the lower left corner are the Pearson correlation coefficient test results and the upper right corner show the Spearman correlation coefficient test results.

Table 4. Correlation Analysis

	lnEx	lnIm	$lnGDP_C$	$lnGDP_T$	lnLF	lnIFDI	lnOFDI	lnHC
lnEx	1.0000	0.6721***	0.5291***	0.6240***	0.2970**	0.4770***	0.4908***	0.2674**
lnIm	0.6437***	1.0000	0.3656***	0.4754***	0.4235***	0.5717***	0.2299*	0.1317
$lnGDP_C$	0.4277***	0.2458*	1.0000	0.3856***	0.6913***	-0.0210	0.4366***	-0.0766
$lnGDP_T$	0.5497**	0.3692**	0.2187**	1.0000	0.2598**	0.1972	0.2432	0.5322***
lnLF	0.3055**	0.2688**	0.6495***	0.1937	1.0000	-0.1829	0.2255*	-0.4317***
lnIFDI	0.3978***	0.4305***	-0.1014	-0.2332	-0.4160***	1.0000	0.3346**	0.5055***
lnOFDI	0.5076***	0.3187**	0.3796***	0.2656***	0.0370	0.3798***	1.0000	0.6248***
lnHC	0.1137	0.0976	-0.2792**	0.6532***	-0.7708***	0.6517***	0.5479***	1.0000

Note: "*" , "**" and "***" denote significance at the 10%, 5% and 1% level, respectively (Two-tailed test).

Briefly speaking, when the result is greater than 0.75, it means that the degree of correlation between variables is relatively large, and the problem of multicollinearity is more serious, which will eventually result in the certain deviations in empirical results. When the result is 0.5~0.75, it means that the variables are moderately correlated, and if the range is 0.25~0.5, which means that a low correlation exists between the variables, finally a very weak or no correlation between variables when the result is less than 0.25. And the results illustrated that the index are basically does not exceed 0.75, which exhibits that there is no multicollinearity problem between the variables, so as the regression model of this study is reliable. Finally, after applying the fixed effect model, the regression analysis results are shown in the Table 5.

Table 5. The Analysis Results of Fixed Effect Model

	(1)	(2)
	lnEx	lnIm
$lnGDP_C$	0.0340*	0.0544
	(0.68)	(1.14)

lnGDP$_T$	0.0637	0.0691**
	(1.21)	(0.13)
lnLF	-1.4597***	0.0059
	(-6.82)	(0.01)
lnHC	3.3092**	2.5543
	(3.72)	(2.04)
lnIFDI	0.0442	0.0092
	(0.88)	(0.08)
lnOFDI	0.1148	-0.0932
	(2.12)	(-1.79)
_cons	6.4768**	-1.3591
	(2.88)	(-0.28)
Area	Yes	Yes
N	55	55
R^2	0.821	0.108
adj. R^2	0.802	0.016

Note: "*" , "**" and "***" denote significance at the 10%, 5% and 1% level, respectively (Two-tailed test).

From the results in the Table 5 this estimation equation can be summarized in the following equation:

$$\ln Ex_{it} = 6.4768 + 0.034\, lnGDP_{Cit} + 0.0637\, lnGDP_{Tit} - 1.4597\, lnLF_{it} + 3.3092\, lnHC_{it}$$
$$+ 0.0442\, lnIFDI_{it} + 0.1148\, ln\, OFDI_{it} + \epsilon_{it}$$
$$\ln Im_{it} = -1.3591 + 0.0544\, lnGDP_{Cit} + 0.0691\, lnGDP_{Tit} + 0.0059\, lnLF_{it} + 2.5543\, lnHC_{it}$$
$$+ 0.0092\, lnIFDI_{it} - 0.0932\, ln\, OFDI_{it} + \epsilon_{it}$$

We can see that firstly, in the trade of goods exported from China to Thailand, regional GDP has a positive impact on exports, and the impact is significant at level of 10%, in addition, it is positively correlated between the GDP of Thailand and the imports, and the significant level is 5%, for every 1% increase in GDP from China and Thailand, Chinese exports and imports increase by 3.4% and 6.9% respectively. Then there is a negative influence between the labor force and exports, specifically, every 1% increase in labor force will lead to a decrease of 1.5% in Chinese export trade to Thailand, with a significant level of 1%. Conversely, foreign direct investment is positive correlated with the exports whether it is inward or outward,   but the effect is not significant. Then as for the impact of human capital, it greatly promotes the export trade, exactly speaking, every 1% increase in human capital will bring out a rise of 3.3% in exports. Secondly, in the trade of commodities from Thailand, except for outward foreign direct investment, there is a positive relationship between other variables with the import trade.

5. Conclusion and suggestion

Base on the above results, it can be seen that GDP has an active impact on the bilateral trade. In the exports, due to the rapid economic development has provided good infrastructure for export enterprises in these five provinces, and improved the production scale and competitiveness of export products, moreover, these coastal regions in eastern China were the first to enjoy the Chinese policy of reform and open to the outside world, and their national economic level ranks among the best in the country. And similarly in terms of import trade, Thailand's GDP also drives its exports, in other words, GDP of Thailand has become one of the important driving factors for Chinese imports.

Finally, As for the impact of foreign direct investment on China-Thailand international trade, it didn't have the significant effect whether it's exports or imports, and because the data of IFDI are all foreign investment in each province, and the data of OFDI are the investment from every province to total foreign countries, due to historical reasons and preferential policies in various provinces, most of the foreign enterprises that first entered the Chinese market are from Japan, South Korea, the United States, Europe and other developed countries, moreover, the foreign direct investment in a certain country has increased, it will bring out a most direct manifestation is that the increase in the exchange of products, technologies and productivity between the two countries, which is ultimately reflected in the import and export volume of the two countries, so most of the products will eventually return to Japan, South Korea, Europe, America and other developed countries. Therefore, the FDI contribution of these countries to China is not reflected in China-Thailand trade.

In addition, both domestic and international trade are closely related to employment, so this paper also studies the impact of employment situation on trade. The results show that the labor force inhibits the development of Chinese export trade to Thailand. There are two reasons: firstly, from the structure of goods exported from China to Thailand, it can be found that most of them are mechanical and electrical products, base metal products and other processed products, and China itself has a strong demand market after decades of economic development. Furthermore, these provinces are all coastal areas with high transportation efficiency, for example, Guangdong is close to Hong Kong, Macao and Taiwan regions which are more convenient for foreign investment, Shandong is close to Japan and South Korea, then as this paper referred to that most of the foreign companies that first entered the Chinese market came from Japan, South Korea, the United States, European countries and other places, these foreign companies focused on processing trade and made good use of Chinese abundant labor resources for production. These countries are all developed countries with the advanced knowledge and technology, as well have a huge demand market, so foreign-funded enterprises have seized the local labor market, resulting in more and more labor inflows. Thus most of the products will either stay in the Chinese market or flow to other developed regions, so the labor force is negative correlated with exports to Thailand.

The second and essential point is that from some relevant data, the proportion of secondary industry on these regions' GDP in the past 10 years are decreasing year by year, it can be found that the most of provinces in 2010 was as high as about 50%, and it has roughly dropped to 39% in 2020. It shows that the industrial structure is mainly transferred to the tertiary industry (high-tech industry), and the demand for processed and manufactured products in the domestic market is also gradually diminishing. However, according to the specific commodity types, most of the products exported to Thailand belong to processing trade(secondary industry), so the labor force flow to the tertiary industry or other foreign companies will gradually unable to meet the market demand in Thailand.

In the meantime, human capital become to the most important determinant which it has a notable effect on exports of these provinces. Because as mentioned above, the ratio of the secondary industry to GDP in these five provinces is decreasing year by year, which means that their industrial structure is mainly transferred to the tertiary industry, and this industry belongs to the high-tech industry and service industry. Due to the the economic situation in these coastal areas is relatively developed, and it has superior geographical location and high degree of economic openness, many enterprises focusing on high-tech products have been attracted while the industrial structure has been transferred, and these areas are the first to enjoy Chinese policy of reforming and opening up. Therefore, the service trade in coastal areas has developed rapidly. Moreover, the service trade cooperation between China and Thailand has become a new focus in recent years. With the rapid development of trade, service trade is becoming more and more important and the scale of development is also expanding. At present, the cooperation between China and Thailand is mainly based on traditional service industries, such as education, communication, tourism, transportation and so on. These jobs belong to the knowledge-intensive industries, so the improvement of human capital can effectively promote China's export to Thailand. Furthermore, since October 2013, China and Thailand jointly issued the "Vision Plan for the Development of China-Thailand Relations", this plan involves many service trade fields such as tourism, transportation, finance, culture and education, and technological innovation, it refers to apply the innovative and advanced development concepts of service trade, service trade methods, and service trade industrial structure to accelerate the development of China-Thailand service trade. Therefore, the demand of service trade between China and Thailand for the talent market is also huge.

In a conclusion, GDP and human capital have become the important factors to boost the Chinese eastern coastal trade with Thailand, while the number of labor force is the opposite, which restricts the development of export trade. On the other hand, the limitations of this study is that regard to the development of Chinese trade in goods imported from Thailand, since the data of independent variables are mainly from China, and relevant data at the macroeconomic level of Thailand is difficult to obtain, so except the GDP of Thailand, the other variables have not been a significant factor driving the imports. Now according to the above analysis conclusions, this research comes up with the following suggestions:

Firstly, due to the location advantage, these Chinese provinces and Thailand are both coastal areas, they have the high GDP, which means the the strong infrastructure construction, then the government should make full use of local resources, industries and location advantages, support some key industries, and build an independent innovation system that is conducive to participating in the global value chains specialization. For example, giving full play to its comparative advantages, scale advantages and price preference advantages to formulate the development strategic positioning and industrial guidance system; And encouraging powerful enterprises to increase investment in R&D and equipment, and develop original technologies with independent intellectual property to improve the core competitiveness of the industry; And accelerating the establishment of a technological innovation system with enterprises as the main body and closely integrating the production, learning and research, encourage companies to conduct joint research with professional colleges and research institutions,   further to establish an innovation mechanism for sharing risks and achievements.

On the other hand, as mentioned above, the service trade between China and Thailand is gradually emerging, mainly in the fields of communication, tourism, and logistics. Therefore, from a national perspective, China and Thailand should speed up the construction of transportation infrastructure, such as the implementation of the China-Thailand railway. At present, the trade is mainly transported by sea and river, and the proportion of road, railway and air transport is relatively low. However, compared with sea transportation, railway transportation has the advantages of low cost, fast speed, and is not easily affected by the marine environment, which has the advantages of continuity and safety. Therefore, facilitating the progress of transportation infrastructure between China and Thailand, its fruit, rice, natural rubber and other bulk products can enter the Chinese market more conveniently and quickly, and Chinese mechanical and electrical products, chemical products and other commodities will also get into Thailand through this international channel, so as to effectively improve the circulation efficiency of resources, commodities and people between the two countries, and play a positive role in the international trade.

Lastly, for regions facing the transformation of industrial structure, the government should promote the development of education, and increase the accumulation of professional and high-level talents. National education is the basic part for the development of human capital. The practice of social production shows that there is a positive relationship between the level of labor productivity and education degree of workers. Most of countries, at present, especially the developed countries, take vigorous development of education as their most important strategies and measures in order to obtain advantages in economic development. Therefore, in order to enhance the competitiveness of the economies of various regions, it is crucial to cultivate more professional and high-level talents. For example, the education department can vigorously encourage and develop more applied majors that are closely integrated with regional economic construction, and strengthen the training of talents in short supply based on the needs of the society. Moreover, due to the relatively developed economy and numerous excellent universities in coastal areas, the education department should encourage universities to launch more cooperation

projects with the relevant department of Thailand, such as introducing preferential policies for exchange students related to Thailand, and actively absorbing overseas high-quality students through scholarship encouragement and subsidizing part of tuition fees and so on. On the other hand, the government can issue some preferential policies, reinforce the protection of domestic human capital resources, such as improving work benefits, to avoid the loss and shortage of high-quality talents.

Last but not least, from the national perspective, in terms of culture, China and Thailand should strengthen the cooperation between the cultural departments of the two countries and increase the promotion of their own culture and arts in the other country. In terms of education, the two sides should implement the educational cooperation agreement and the agreement on mutual recognition of higher education qualifications and degrees, and deepen the cooperative research between government departments, educational institutions and private education for both countries. Based on the strategic partnership between China and Thailand, strengthening the cooperation in the field of culture and education between the two countries will help to cultivate more talents who understand the two countries' cultures, laws and regulations, and professional knowledge in the fields of finance and trade. Deepening the China-Thailand cooperation in the field of culture and education is of great significance to promoting the healthy and sustainable development of the cooperative relationship between the two countries, enhancing the friendship between the two peoples from generation to generation, and accelerating the prosperity and development.

REFERENCES

1. Brouwer, J., Paap, R., & Viaene, J. M. (2008). The trade and FDI effects of EMU enlargement. Journal of International Money and Finance, 27(2), 188-208.

2. Cai, K., Shao, Y., & He, J. (2013). Influence of Foreign Contracted Projects on China's Outward Direct Investment:Empirics based on Country Specific Panel Data. Journal of Finance and Economy. 25(9), 21-28.

3. Clausing, K. A. (2000). Does multinational activity displace trade?. Economic Inquiry, 38(2), 190-205.

4. De Groot, H. L., Linders, G. J. M., & Rietveld, P. (2005). Institutions, governance and international trade: opening the black box of OECD and GDP per capital effects in gravity equations. IATSS research, 29(2), 22-29.

5. Dong, Y. (2008). Statistical research on regional economic differences in Zhejiang from the perspective of human capital. China Academic Journal Electronic Publishing House, 1-165.

6. Durkin Jr, J. T., & Krygier, M. (2000). Differences in GDP per capital and the share of intraindustry trade: The role of vertically differentiated trade. Review of International Economics, 8(4), 760-774.

7. Gao, Q. (2016). Regression Analysis of Factors Influencing Chinese Goods Export. China Academic Journal Electronic Publishing House, 12(8), 22-24.

8. Kogut, B., & Chang, S. (1991). Technological capabilities and Japanese foreign direct investment in the United States. The review of economics and statistics, 73(8), 401-413.

9. Lian, F., & Li, X. (2008). Dynamic analysis of the relationship among FDI, foreign trade and economic growth in China. HLJ Foreign Economic Relations＆Trade. 163(1), 36-38.

10. Lu, X., & Lian, Y. (2011). Factor Endowment, Institute Constraints and Export Potential in China. China Academic Journal Electronic Publishing House, 10(3), 3-11.

11. Ma, W., Cao, X., & Li, J. (2021). Impact of logistics development level on international trade in China: a provincial analysis. Sustainability, 13(4), 2107.

12. Meephokee, C., Cholpaisal, A., Roopsom, T., & Intanuphat, D. (2011). Factors affecting trade and investment relations between Thailand and the LAO People's Democratic Republic. Thai Journal of East Asian Studies, 16(1), 25-38.

13. Mundell, R. A. (1957). International trade and factor mobility. The American Economic Review, 47(3), 321-335.

14. Sun, H. (2001). Foreign direct investment and regional export performance in China. Journal of Regional Science, 41(2), 317-336.

15. Vollrath, T. L., Gehlhar, M. J., & Hallahan, C. B. (2009). Bilateral import protection, free trade agreements, and other factors influencing trade flows in agriculture and clothing. Journal of Agricultural Economics, 60(2), 298-317.

16. Wang, C., Wei, Y., & Liu, X. (2010). Determinants of bilateral trade flows in OECD countries: evidence from gravity panel data models. The World Economy, 33(7), 894-915.

17. Xu, R. (2010). An Empirical Study on Agricultural Products' Intra-industry Trade Status and Influential Factors: A Comparison among Shandong, Guangdong and Zhejiang Provinces. China Academic Journal Electronic Publishing House, 2(6), 85-91.

18. Xu, Y., & Liu, D., & Zheng, L. (2017). Econometric Model Analysis of Influencing Factors of Import and Export in Zhanjiang City. Advances in Economics, Business and Management Research, 53, 810-813.

19. Yang, Hui., He, Q., & Jiang, Z. (2010) Empirical study on the influencing factors of Shandong processing trade upgrading based on global value chain. Journal of East China Economic Management, 24(8), 23-26.

20. Yin, L., & Yu, J. (2021). Research on influencing factors of Chinese mechanical and electrical products exporting to Thailand market —— based on multiple linear regression model. 2nd International Conference on Schooling Advances, Microeconomics and Management Science, 67-72.

21. Yin, M., Sheng, L., & Wu, B. (2019). The influence of the factor endowment and institutional environment of the host countries along the "Belt and Road" on Chinese foreign economic and trade cooperation mode and location selection. Journal of World Economy Studies, 81-92.

22. Yu, L. (2022). Research on the influence of macroeconomic factors on the total volume of import and export trade —— based on the empirical analysis of Jiangsu Province. Journal of International Trade, 09(2), 36-41.

23. Zhang, X. (2017) An empirical study on regional differences and influencing

factors of foreign trade in the Yangtze River Economic Belt -- Based on GMM method of Provincial Dynamic Panel Data. Inquiry Into Economic Issues, 91-96.

24. Zhang Y., Fu D., & Zhou S. (2016). Knowledge-intensive Service Export Potential and its Determinants in China's Provincial Economies. Journal of International Trade, 85-96.

25. Zhao, Q. (2014). Research on the effect of FDI on Chinese import and export trade. Journal of Economic Research Guide, 24(5), 264-266.

26. Zhu, X., & Li, Y. (2011). Agricultural Product Trade's Competitiveness and Complementarity between China and Five Central Asian Countries. Journal of International Trade, 27(3), 17-22.

VITA

NAME	XINXIN LI
DATE OF BIRTH	12 October 1998
PLACE OF BIRTH	Nanning, China
INSTITUTIONS ATTENDED	Guangxi University of Finance and Economics
HOME ADDRESS	Tangcheng Huafu Community, Xixiangtang District, Nanning City, Guangxi Province, China
PUBLICATION	None
AWARD RECEIVED	The First Prize in China University Business Elite Challenge