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FDI, FOREIGN TRADE AND ECONOMIC GROWTH

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Abstract: With the acceleration of China's reform and opening-up, and the expansion of foreign trade, foreign direct investment (FDI) and foreign trade have become the main force driving China's regional economic growth. This paper studies the impact of FDI and foreign trade on economic development. By using the panel data model, the data of 30 provinces in China from 2001 to 2020 is analyzed, showing that FDI and foreign trade are positively correlated with economic growth for China. Compared with FDI, foreign trade can promote China's economic development. In addition, there are apparent differences in the impact of FDI and foreign trade on economic growth between eastern and middle and western provinces, and the economic development of China's provinces is uneven. In order to alleviate the unbalanced development, the Chinese government should: 1. Speed up infrastructure and transportation construction; 2. Differentiate regional trade policies; 3. Coordinate and strengthen cooperation among the eastern, middle and western regions.
Keywords: Foreign Direct Investment (FDI); Foreign trade; Economic growth; Regional disparity

1 INTRODUCTION

China is not only the world's second largest consumer market, but also one of the largest major trading countries. With the rapid development of the market economy, China's import and export trade has been growing, which has a certain impact on the world economy. China is one of the fastest growing economies in the world, and the development of import and export trade generates huge gains for trade targets and creates favorable conditions for international cross-border investment. Today, China has a pivotal position in the international arena, so the volume of China's import and export transactions, the exchange rate of the Chinese Yuan and other various economic patterns have a certain impact on the world economic landscape. The trend of China's economy, which is related to the overall development of China, is also related to the stability of the global economy.

Since the reform and opening up, the Chinese government has vigorously introduced foreign investment and expanded trade by taking a series of preferential measures. Trade volume and FDI have been growing year by year. In the context of China's open economy, economic growth is not only driven by domestic consumption, but also requires more foreign trade and foreign investment. However, economic growth in each region of China does not go hand in hand, but there are first and second, strong and weak. China's regional economies largely show an uneven growth pattern, which seriously restricts its overall development. This is closely related to the significant differences in the spatial distribution of FDI and foreign trade. Therefore, it is necessary to make an argumentative analysis of the data through econometric models to verify how the impact of foreign trade and FDI on the Chinese economy really is. In this paper, we study two questions: Did trade and FDI affect GDP developments in China? Were the effects different across provinces?

This thesis uses FDI, Trade and GDP of 30 provinces in China from 2001 to 2020 as data. Using Eviews, a panel data model is established based on the results of unit root test and Hausman test. The relationship between FDI, foreign trade and economic growth in China is empirically studied. Combining China's actual situation, economic development theory, and empirical analysis, we provide suggestions for formulating and improving economic policies in China's current economic situation.2 The results of the analysis show that FDI, foreign trade and economic growth have a positive long-term relationship, and both FDI and foreign trade promote economic growth, and the economic growth effect of foreign trade is stronger. In addition, the impact of foreign trade on economic growth in the eastern region is significantly better than that in the middle and western regions, but the impact of FDI on economic growth is not significantly different among the three regions.

2 LITERATURE REVIEW

In exploring economic development, the link between FDI, foreign trade and economic development is a field of research that has received more attention from contemporary scholars. There are usually two views on the relation between FDI, foreign trade and economic development. One view is that FDI and international trade have a positive effect on a country's economic growth. Dritsaki argues that foreign trade, FDI and economic growth in Greece have a long-run equilibrium relationship and that the three can reinforce each other under an open policy [1]. Nguyen studied the impact of FDI, exports, and imports on Vietnam's economy by using the ordinary least square method. The test confirmed that FDI and international trade are related to Vietnam's economic growth. FDI and exports positively affect Vietnam's economy.

Another view is that FDI and international trade have a limited impact on the economic growth of a country. Sharma and Panagiotidis analyze the relationship between exports and imports and economic growth in India by taking relevant data of India from 1971 to 2001 through econometric measures such as VAR model and cointegration test. The results of the

empirical analysis show that there is no stable relationship between import and export trade and economic growth in the long run, and export trade does not contribute to economic growth in India. Belloumi conducted a cointegration test using the ARDL model to study a long-term relationship between economic growth, FDI, trade openness, labor, and capital investment in Tunisia and used Granger causality to test whether there is a dynamic causality. The results show that there is a long-run relationship between these variables and there is no significant Granger causality between trade and economic growth, FDI, and economic growth. From previous research results, the relationship between GDP growth and its influencing factors has been found to be different for different economies and market structures. Therefore ,for China, the relationship between the three factors still needs to be studied.

Kalirajanet analyzed the relationship between exports, FDI and GDP in six emerging countries and found that the role of exports and FDI on local economic growth varies significantly across countries. Through the Panel-Data Approach, Tiwari and Mutascu empirically analyze the relationship between FDI and economic growth in 23 Asian countries. The results indicate that FDI and exports promote the economic development of these Asian countries, and the investment of labor and capital can also promote the growth trend. These two articles have inspired us to think about the differences between regions. However, their studies are country-based and do not examine the differences between regions of a country [2]. Therefore it is of theoretical and practical importance to study the economic growth factors between regions in China.

The paper is divided into five parts: in the second part, the current situation in China is analyzed. By introducing the current situation and structural characteristics of FDI, foreign trade and economic growth in China, the strengths and weaknesses of China in international trade are analyzed. The third part is the theoretical basis of the relationship between FDI, foreign trade and economic growth. The theories related to FDI, foreign trade and economic growth are introduced by analyzing previous studies. In the fourth part, which is the focus of this study, an empirical analysis of the relationship between FDI [3], foreign trade and economic growth for thirty regions in China is provided. Through the panel data model, the relationship between these three variables is clearly visible in both macro and micro dimensions. And through the individualized study of 30 provinces, the differences among provinces are analyzed. In part five the problems in the development of China's foreign economy are focused on and reasonable countermeasures are proposed to promote the development and economic progress of China's foreign economy.

3 THE INSTITUTIONAL BACKGROUND

3.1 Trade

In December 1978, on the one hand, China actively responded to the wave of international industrial transfer and took the initiative to integrate itself into the world division of labor system; on the other hand, it continued to explore the establishment of special economic zones, open coastal cities and other "enclave" economic pilot projects, and carried out institutional reforms such as the responsibility system of trade contracting and special customs supervision zones. The development of foreign trade has thus entered a new chapter. In November 2001 [4], China formally joined the WTO, which is a milestone of China's deep participation in economic globalization and marks a new historical stage of China's reform and opening-up. During this period, China actively practiced the concept of free trade, carried out foreign trade policy reform mainly around its WTO accession commitments, and participated deeply in the global trading system. China's mega-market has opened its doors wider and wider to the outside world, and its foreign trade partners have included more than 230 countries and regions. In 2001, China's total foreign trade amounted to 509.77 billion dollars, increasing about 24 times over 20.6 billion dollars in 1978 [5].

According to Melitz's New New trade theory (NNTT), the export growth of a country can be decomposed into two paths: the intensive margin and the expansion margin. The former points to the changes in the scale of export products, while the latter points to the changes in the types of export products and markets. In the years following WTO accession, a large number of low-quality firms began exporting, causing a decline in the overall quality level of China's export products. Relying heavily on a quantity-based development model, China’s foreign trade growth is vulnerable to changes in external demand, trade protectionism, and rising costs. Therefore, when the U.S. subprime crisis broke out in 2008, China's foreign trade fluctuated sharply in the face of the severe contraction of external demand. In 2009, for the first time since the reform and opening up of China, China's import and export trade experienced negative growth of 13.9%, with a year-on-year decrease of US$355.7 billion, of which export trade was most significantly affected, with a year-on-year decline of US$299.1 billion and a growth rate of -16%. [6] China's export expansion vulnerability, which is highly dependent on volume expansion, was wholly exposed during the financial crisis. In order to cope with the negative impact of the financial crisis on foreign trade development, China quickly adopted a series of incentive measures such as increasing the export tax rebate rate and promoting trade facilitation, which enabled China's foreign trade to resume growth relatively quickly.

Although the growth rate of trade still slowed down after the financial crisis (even negative growth again in 2015 and 2016), it was still higher than the world level in the same period. It has maintained its position as the world's top exporter and second-largest importer for years, and in 2014 it overtook the United States to become the world's top goods trader for the first time [7]. While maintaining its scale advantage, China's foreign trade development has further optimized and improved its structure, which is mainly reflected in the following three aspects. First, the new competitive advantage of goods with technology, brand, quality and service as the core has been rising, then gradually replacing the processing and assembling link which only relies on the advantage of labor resources to engage in international industrial division of

labor, and promoting foreign trade to the middle and high end of the global value chain. Second, China has actively explored new markets and cooperation space, which is highlighted in China's import and export volume with countries along the "Belt and Road" accounted for an increase in the proportion of China's total imports and exports, higher than the growth rate of trade with developed countries, which is essential to diversify market concentration risks and achieve market diversification strategy [8]. Third, trade in services has grown faster than the trade in goods, with an average annual growth rate of 8%, and has maintained its position as the world's second-largest services trader for seven consecutive years now, but the trade deficit is still not small.

Overall, as China's economic development enters the "new normal," the focus of China's foreign trade development has changed from the previous scale expansion to the current stage of high-quality development. At the same time, under the promotion of comprehensive deepening reform and opening up, China has formed a new pattern of high level opening-up, creating a more extensive space for China's foreign trade development. This has created a more expansive space for China's foreign trade development.

3.2 FDI

The development of FDI in China is mainly divided into three stages, the first stage is the initial stage, from 1979 to 1991. Before 1979, there was almost no FDI in China. With the announcement of reform and opening up in 1978, China opened its door to foreign businesspeople. The first laws and regulations on FDI were formulated in 1979 to ensure the legalization of foreign operations in China. In 1980, the Chinese government established four special economic zones: Shenzhen, Zhuhai, Shantou in Guangdong Province [9], and Xiamen in Fujian Province. These cities have convenient coastal transportation and excellent geographical location. The government hopes to attract overseas attention through these windows, especially in Singapore, Indonesia, and other places where overseas Chinese businessmen congregated. However, due to the cautious attitude of foreign investors, the effect of these policies was not apparent. Foreign capital entered the domestic market on a small scale. It was not until 1991 that FDI reached 4.366 billion.

The government has also established some small development zones in inland areas, such as free trade zones, export processing zones and tourism zones. These development zones were characterized by low-cost and centralized resources, which could be deployed at any time. These actions had a positive impact on the actual direct use of foreign investment. It is worth mentioning that FDI in 1992 was twice that in 1991, and the inflow of foreign investment into China doubled in 1993, reaching US US$2.75 billion. Despite the Asian financial crisis in 2000, the Chinese market was not significantly affected, and the inflow slowed down slightly. In order to solve the widening regional gap, the government adopted more preferential policies for inland areas. In 1999, the Chinese government put forward the strategy of "the development of the western region in China." The government hoped to use the remaining economic development capacity of the eastern region to improve the western region's economic and social development level. However, due to the lack of supporting facilities and investment environment for industrial investment, this policy did not led to a significant transfer of FDI to the middle and western regions.

The third stage is from 2001 to now. FDI has entered a phase of stable development. After China joined the World Trade Organization in 2001, according to the relevant requirements of the WTO, China revised three laws and regulations to classify foreign investment. These actions defined the optional geographical distribution and target industries of FDI in China and accelerated FDI inflow into the domestic market [11]. Since 2004, combined with the specific environment and characteristics of the capital market, the investment behavior of foreign investment enterprises has been liberalized, and foreign investors have been given the right to establish investment companies Although the global financial crisis has weakened foreign investment, and China's FDI fell to US$9.5 billion in 2009, it has returned to the pre-crisis state of US US$11.47 billion in 2010. Since then, it has maintained a steady growth trend. Under the background of the COVID-19 pandemic in 2020, the total global FDI decreased by more than one-third, but China's FDI bucked the trend and increased by 4%, reaching the US US$163 billion, ranking the first in the world [12].

At present, FDI has become one of the vital forces to promote China's rapid economic growth. The large-scale entry of FDI has effectively announced China's reform and opening up, accelerated the process of marketization and internationalization, and promoted the sustained and rapid growth of China's economy to a great extent. From the perspective of foreign investment, foreign capital flowing into the manufacturing industry is the largest, accounting for 21.5% of the total share. It is still mainly labor-intensive capital. The primary purpose of its entry is to take advantage of China's large amount of cheap labor resources. This also determines that China needs to introduce technology-intensive foreign capital to improve China's overall technology level. Also, the distribution of FDI in China shows that the eastern region occupies an absolute leading position, and the gap in the share of foreign investment in the eastern and western areas is still pronounced. At present, 87.8% of foreign investment is distributed in the eastern region, 9.1% in the middle region, and only 3.1% in the western region.

3.3 Economic Growth

GDP is one of the most important standards to measure economic output and production, and it can describe the economic situation. GDP growth rate is also the only best indicator of economic growth. Since the implementation of the open-door policy in 1978, China, a developing country, has experienced excellent trade system reform. So far, China's economy has developed rapidly and has become the second-largest economy in the world except for the United States. GDP growing from the US$149.5 billion in 1978 to the US$14.7 trillion in 2020 took only 43 years [13]. In recent years, against the

background of the slowdown of world economic growth, China has actively responded to various challenges and maintained steady economic development.

It can be seen from GDP growth that foreign trade growth has made an outstanding contribution to China's economic growth. In 1978, China's total imports and exports amounted to US$20.6 billion, accounting for less than 1% of the total global trade. In 2001, the total value of China's imports and exports was US$509.7 billion. During this period, the growth rate of total imports and exports was 23.7%. Meanwhile, from 1978 to 2001, GDP soared from US$0.05 trillion to US$1.73 trillion, with a corresponding GDP growth rate of 33.6% [14]. However, in 2020, the total import and export value of China's goods trade was US$5.02 trillion, 244 times that of 1978. As a result, GDP also grew steadily to US$15.85 trillion. Now, China is the world's largest commodity exporter and the second-largest commodity importer, with a market share of 13.1% of the global import and export share.

In addition, the increase of FDI is also inseparable from China's economic growth. For example, based on the analysis of the changes of provincial GDP data in the past 40 years, Guangdong Province has been classified as a special economic zone since 1978. In the next two decades, the GDP has increased rapidly from 18.585 billion yuan to 853.088 billion yuan and has be come economically the largest province in China in 1998.Similarly, the GDP of provinces classified as special economic zones such as Jiangsu and Shanghai also soared.

Taking China as a whole, China's GDP development is good, and the quantity and quality of economic growth are good. However, for a big country like China, it is easy to cover up some internal problems only by analyzing the country as a whole. Therefore, we divide the country into three regions: the East, the middle, and the West. Through the horizontal comparison of the economic growth of the three regions, we can find the gaps and deficiencies between regions. The division between regions is shown in Table 1 below.

Table 1 Regions Division

EAST	MIDDLE	WEST
Beijing	Jilin	Chongqing
Tianjin	Heilongjiang	Sichuan
Hebei	Anhui	Guizhou
Liaoning	Jiangxi	Yunnan
Shanghai	Henan	Shaanxi
Jiangsu	Hubei	Gansu
Zhejiang	Hunan	Qinghai
Fujian	Shanxi	Ningxia
Shandong	Inner Mongolia	Xinjiang
Guangdong	Guangxi	
Hainan		

Horizontal comparison of the GDP data of various regions in China shows that the economic development of the three regions in China is uneven and has a significant regional gap. The eastern region is the most developed region in China's social and economic development. The total GDP of the eastern region in 2020 was 52573.303 billion yuan, accounting for 51.75% of the national total in the same period. The western region has a vast territory, and the land area accounts for 70.6% of the total area of the country. However, in 2020, the GDP of the western region is less than 20% of the national GDP. The middle region of China is mainly manufacturing and agricultural production. Compared with the western region, the GDP of the middle region is better [15], but it accounts for less than 30% of the national GDP in the same period. However, by vertically comparing the economic development of various regions, it can be found that since the 21st century, the economic growth rate of China's middle and western regions has caught up with and surpassed that of the eastern region. The annual GDP growth rate of the western region leads the country. The regional average GDP growth rate in 2020 reached 3.89%, while the eastern region, which accounts for the largest proportion of China's GDP, shows a steady downward trend. This is closely related to China's focus on supporting the economic development of the middle and western regions at the macro level and narrowing the differences between regions. The policy is to adhere to the overall regional development strategy of promoting the western development, revitalizing the northeast and other old industrial bases, pushing the rise of the middle region and encouraging the eastern region to take the lead in development, improving the regional coordination and interaction mechanism, and forming a reasonable regional development pattern. After 30 years of reform and opening up, the eastern region has entered the post-industrialization stage, using labor and land factors. The way that the low comparative advantage promotes economic growth has failed. China must transfer traditional industries, upgrade economic structure, and use the comparative advantages of technology and human capital to promote economic growth, also in line with the neoclassical growth theory.

4 THEORETICAL BACKGROUND & EMPIRICAL EVIDENCE

The purpose of this chapter is to provide theoretical background and literature review for the relationships between FDI, foreign trade, and China's economic growth.

4.1 The Neoclassical Growth Model

The Neoclassical growth theory describes achieving economic growth through the joint action of labor, capital, and technology. At the same time, this theory points out that the factors of production can replace each other, so technological progress is significant for economic development. According to Solow, this production function can be written as Y =A* F (K, L), in which Y represents GDP, A is a determinant level of technology, K describes the capital share, and L denotes the labor force.

In neoclassical analysis, the impact of FDI on economic growth is mainly reflected in the increase of human capital accumulation and labor growth, the introduction of new technology, and so on. These kinds of changes are exogenous. Therefore, FDI is an essential channel for the host country to promote the economy through capital accumulation. Le et al. studied the relationship between FDI and local economic growth in Vietnam. They found that the larger the capital scale of FDI, the more significant the impact on economic growth, and reached a certain threshold. The neoclassical model also suggests that technological progress affects economic growth. Borensztein et al. found that technology spillover promotes the economy's long-term growth based on the accumulation of human capital. Still, it depends on the capital stock and absorptive capacity of enterprises in the host country of economic growth [16].

Many other relevant documents show that FDI is equally important for China's economic growth. For example, according to Berthelemy and Demurger, they used panel data to analyze 24 provinces in China, obtained that there is a dynamic relationship between FDI and economic growth, found that the decision of FDI directly affects economic growth, and put forward new evidence that human capital contributes to growth through the use of foreign technology. Ran et al. studied the impact of FDI on 30 provinces and 19 industries in China using a panel data model and proved that the inequality of FDI would expand the differences of the regional economy. The eastern coastal provinces are the primary beneficiaries. On the contrary, the middle and western provinces have had a substantial negative impact. Yu et al. also found that the massive influx of foreign capital into China undeniably impacts the economy. The accumulation of capital investment has a positive impact, and the employment opportunities with the increase of foreign investment also have a positive effect. Because of the lack of data, this paper does not include the relevant data of human capital in the model.

4.2 Heckscher－Ohlin Theory

The Heckscher-Ohlin theory assumes that there are only two factors of production, labor and capital. Therefore, countries with abundant capital have a comparative advantage in capital-intensive goods while countries with abundant labor have a comparative advantage in labor-intensive goods. Consequently, a country exports goods that use its relatively plentiful and cheap factors of production intensively in international trade, while imports are intensive use of its relatively scarce and expensive elements of production [17]. As a result, the import and export of goods between the two countries through international trade has improved their consumption level and benefited from international trade. Many studies have found that foreign trade plays a vital role in China's economic growth. For example, Li et al. uses the Granger causality test to show a Granger causality between China's foreign trade and economic development. Furthermore, the cointegration test shows that foreign trade can promote economic growth, and there is a long-term stable equilibrium relationship between foreign trade and economic growth.

Similarly, according to Tsen, the Granger causality test is also used to prove the two-way Granger causality between export and economic growth, domestic demand and economic development, and export and domestic demand. By studying the relationship between foreign trade, including total export and import, Li et al. has found that there is a positive correlation between total export and GDP growth, and there is a causal relationship between them. Thus, foreign trade promotes the economic development of East China. However, the import does not directly promote the growth of GDP, so it is impossible to prove that there is a long-term causal relationship between import and GDP. Also, many scholars have concluded that exports affect economic growth [18]. Some of them used the simultaneous equations model, Salvatore, to test the data of 52 developing countries, and set dummy variables in equations, which can test how the relationship between the two changes over time. Nosakhara and Milton used the vector autoregressive model to analyze the positive relationship between Nigeria's foreign trade and economic growth from 1981 to 2010. They found that foreign trade innovation can expand exports and then promote rapid economic development.

4.3 Kiyoshi Kojima- Theory of Marginal Industry Expansion

Kojima's theory is based on Herschel Olin's theory to analyze the relationship between FDI and foreign trade. Suppose there are two countries A and B. country A is capital-intensive, and country B is labor-intensive. In country A, commodities X have comparative advantages; In country B, commodities Y have comparative advantages. According to the H-O-S theory, country A will export goods X, and country B will export goods Y. If country A chooses to invest directly in the X industry of country B, the imports and exports trade of country B will expand. Similarly, the imports and exports trade of country A will also increase. This theory holds that FDI is not only the flow of funds but also the transfer of capital, technology, and management knowledge to the host country. In addition, Kojima pointed out that when the investing country directly invests in the relatively inferior industries (i.e., marginal industries) of the other country, direct investments create trade.

Therefore, Kojima mentioned that FDI and foreign trade are complementary. The most important criteria for foreign investors should consider the existing and potential comparative advantage model between the investing country and the host country and make the FDI from the relatively unfavorable industries of the investing country. Starting from marginal industries, the host country can create more quantitative and more significant benefits for trade because of the lack of

capital, technology, and management skills. Carter and Yilmaz found that when Turkish enterprises export goods to the host country or attract investment from the host country to enter the foreign market, the two plans are complementary. Similarly, Marchant et al. studied the relationship between FDI of the U.S. and export commodities of East Asian countries through the OLS method. They concluded that there is a complementary relationship between FDI and export. Many scholars have also studied the relationship between FDI and trade in different countries through different econometric methods. For example, Baliamoune-Lutz used the Granger causality model to prove a causal relationship between FDI and export volume and that FDI can positively impact export and economic growth. In the context of trade liberalization in Latin America, Cuadros et al. examined the correlation between FDI, trade, and economic growth in Mexico by using the VAR model and supported the hypothesis that FDI drives economic growth.

5 EMPIRICAL ANALYSIS

In order to further analyze the relationship between the influence of foreign trade and FDI on economic growth in Chinese provinces in the empirical part of this chapter, combines data from 30 Chinese provinces for the years 2001-2020 was combined to construct a fixed-effects panel model, aiming to quantitatively analyze the extent to which the economic development of each Chinese province is influenced by foreign trade and FDI, and to comparatively study the heterogeneity of the influence of each province.

5.1 Variable Selection and Data Sources

Due to the absence of some samples, we used 30 provinces in China (except Tibet) for the survey from 2001 to 2020. The data were obtained from the statistical yearbooks and statistical communiqués published by the China Bureau of Statistics and each local government. These variables are treated as follows. First, in terms of economic development, GDP was chosen to represent; total import and export trade (TRADE) was chosen to measure foreign trade, and foreign direct investment (FDI) in each province was selected for metric analysis. Second, to eliminate the effect of inflation, prices were corrected by using China's 2001 consumer price index (CPI) as the benchmark. CPI and exchange rate data are obtained from the China Bureau of Statistics. Third, since taking logarithms does not change the nature of the data and correlations, and makes the data smoother, dissipating the covariance and heteroskedasticity of the model. The data in this section are all logarithmically processed data. In addition, due to the stationarity test in this paper, all three variables obey first-order single integer. To avoid pseudo-regression, the model setting in this section will be based on the three first-order differenced variables DLnGDP, DLnTRADE, and DLnFDI. The correlations were tested and analyzed using EViews data analysis software in this paper (Table 2).

Table 2 Variables and Expected Signs

	index	represent	Expected impact on GDP
explained variable	Economic development	GDP	
explanatory variable	import and export trade	TRADE	+
	foreign direct investment	FDI	+

Our hypothesis is composed of two factors: Trade and FDI. According to neoclassical growth theory, foreign direct investment can boost capital growth and thus the economy. Therefore, we speculate that the larger the capital size of FDI, the greater the positive impact on GDP. And according to Heckscher- Ohlin theory, the import and export of goods between countries through international trade have a positive impact on GDP. Table 2 shows the expected sign of each variable (Table 3).

Table 3 Descriptive Statistical Analysis

index	sample size	Mean	Median	Max	Min	standard deviation
GDP	600	1773.5060	1222.0290	10221.8500	36.2571	1823.0290
TRADE	600	725.3873	182.2421	8019.8570	1.9824	1320.9460
FDI	600	45.0085	22.4396	269.5692	0.0299	51.7812
LnGDP	600	6.9718	7.1083	9.2323	3.5906	1.0985
LnTRADE	600	5.2736	5.2053	8.9897	0.6843	1.7265
LnFDI	600	2.8131	3.1107	5.5968	-3.5084	1.7559

Table 3 shows descriptive statistics for different variable. Excluding the province with missing data, the total effective sample size is 600 observations. After logarithmic processing of all the data of the three variables, results can be concluded from the table that the maximum values of different variables is still several times the minimum values. This difference should also prove the content described in the background part. Due to separate policies and geographical locations of various provinces, there is an apparent gap between cities in the eastern region and cities in the middle and western regions.

5.2 Panel Data Model

The Panel Data model expands the sample size and increases the accuracy of estimation compared with the time series, and can describe the data pattern of each individual in a period.

5.2.1 Hypothesis

Based on the research objectives, the empirical part of this paper intends to construct a complete panel regression model to study in-depth relationship and degree of influence of economic growth by the degree of influence of foreign trade and FDI, and to derive individual regression results for each province, and to analyze empirically in comparison whether there is any variability in the influence relationship among provinces. The following research hypotheses are proposed in this paper.

Hypothesis 1: Foreign trade and FDI have a positive relationship with economic growth.

Hypothesis 2: The economic growth of each province is affected differently by foreign trade and FDI.

For hypothesis 1, a two-way fixed effects model was built to investigate the overall results, and the model was set up as follows.

$$DLnGDP_{it}=\alpha_i+\lambda_t+\beta_1 DLnTRADE_{it}+\beta_2 DLnFDI_{it}+\varepsilon_{it}$$
$$(i=1,2,3,...,28,29,30,\ t=1,2,3,...,18,19,20) \quad (1)$$

α_i is the individual effect for entity i.

λ_t is the time fixed effect.

ε_{it} is the error term.

i is the notation for province.

t is the notation for time.

For hypothesis 2, individual fixed effects model was set up to study the specific regression coefficients for each province, and the model was set up as follows.

$$DLnGDP_{it}=\lambda_t+\beta_{1i} DLnTRADE_{it}+\beta_{2i} DLnFDI_{it}+\varepsilon_{it}$$
$$(i=1,2,3,...,28,29,30,\ t=1,2,3,...,18,19,20) \quad (2)$$

λ_t is the time fixed effect.

ε_{it} is the error term.

i is the notation for province.

t is the notation for time.

5.2.2 Stationarity test

In order to avoid pseudo-regression and ensure the validity of the estimation results, the stationarity of each panel series must be tested. And the most common way to test the data stationarity is the unit root test. In the asymptotic process of non-stationary panel data, Levin and Lin found that the limiting distribution of these estimators is a Gaussian distribution, and these results can also be applied to panel data with heteroskedasticity, and an early version of testing for panel unit roots was established. Later, the LLC method for testing panel unit roots was proposed after the improvement by Levin et al. Maddala and Wu also proposed the ADF-Fisher and PP-Fisher panel unit root test methods. In this paper, we choose the LLC test, ADF-Fisher and PP-Fisher tests to detect the smoothness.

Table 4 The Results of the Stationarity Test

Indices	Levin,Lin & Chu		ADF-Fisher		PP-Fisher		Result
	Statistic	Prob	Statistic	Prob	Statistic	Prob	
LnGDP	4.2299	1.0000	13.6907	1.0000	0.2348	1.0000	non-stationary
LnTRADE	0.6845	0.7532	22.9624	1.0000	40.9634	0.9715	non-stationary
LnFDI	-8.3742	0.0000	68.6551	0.2075	62.7492	0.3791	non-stationary
D(LnGDP)	-11.1946	0.0000	103.8130	0.0004	107.8490	0.0001	stationary
D(LnTRADE)	-16.0153	0.0000	229.5360	0.0000	361.7110	0.0000	stationary
D(LnFDI)	-20.6069	0.0000	271.2370	0.0000	333.5400	0.0000	stationary

From the results in Table 4, the original series of the explained variable LnGDP and the explanatory variables LnTRADE and LnFDI cannot reject the original hypothesis test, while the first-order differences of all variables reject the original hypothesis test at the 5% level, which means that the variables LnGDP, LnTRADE and LnFDI are all I(1) variables, while DLnGDP, DLnTRADE, DLnFDI are all I(0) variables. To avoid pseudo-regression and increase the accuracy of the regression results, we build a panel regression model using the variables after first-order differencing. Since the variables we use are I(0) variables, we can judge that they have a long-run equilibrium stable relationship. The purpose of the cointegration test is to detect whether a linear combination of a set of non-stationary series has a stable equilibrium relationship. Therefore, in this paper, we do not conduct cointegration test but to directly use Hausman test.

5.2.3 Hausman test

The choice of panel data models usually takes two forms. One is the fixed effects model (FEM). If the intercept of the model is different for different cross sections or different time series, the regression parameters can be estimated by adding dummy variables to the model. The other type is the random effects model (REM). If the intercept term in the fixed-

effects model includes the average effect of the cross-sectional random error term and the temporal random error term, and both random error terms obey a normal distribution, the fixed-effects model becomes a random-effects model. To consider whether the optimal model for the sample data is a fixed effect or a random effect, Hausman test is made on the differenced sample data (Table 5).

Table 5 The Results of Hausman Test

Test Summary	Chi-Sq.Stat	d.f.	Prob
Cross-section random	11.1379	2.0000	0.0038
Cross-section random effects test comparisons:			
Variable	Fixed	Random	Var(Diff.)	Prob.
D(LnTRADE)	0.1049	0.0951	0.0000	0.0013
D(LnFDI)	0.0434	0.0477	0.0000	0.0039

The p-value is equal to 0.0038, implying that the null hypothesis of no systematic difference is rejected at the 1% level for both, and therefore fixed effects should be selected for estimation in the modeling.

5.2.4 Result of regression analysis

Table 6 Regressions of the Effects of Foreign Trade and FDI on GDP

Variable	Coef.	Std.Error	t-Stat	Prob
DLnTRADE	0.1242***	0.0139	8.9580	0.0000
DLnFDI	0.0533***	0.0079	6.7807	0.0000
_Cons	0.1132***	0.0030	37.7196	0.0000
R-squared		0.2401	F-Stat	5.4830
Adjusted R-squared		0.1963	F-Prob	0.0000

Note: ***, **, * are significant at 1%, 5%, 10% level respectively

Since the coefficients after first-order differencing can be seen as the growth rate of the original variables (Table 6). The above results imply that overall, every 1 percent growth in TRADE causes 0.1242 percent growth in GDP; every 1 percent growth in FDI causes 0.0533 percent growth in GDP.The difference between provinces is reflected in the fixed effect term, collated as shown in the table below: the eastern provinces are basically less than 0, while the middle and western provinces are opposite. It indicates that the economy of the middle and western provinces has been growing faster in recent years. This is consistent with the theoretical data in the previous section (Table 7).

Table 7 α_i Parameter Estimation in Two-Way Fixed-Effects Model

EAST		MIDDLE		WEST	
Beijing	-0.0050	Jilin	-0.0207	Chongqing	0.0234
Tianjin	-0.0102	Heilongjiang	-0.0363	Sichuan	0.0182
Hebei	-0.0176	Anhui	0.0062	Guizhou	0.0247
Liaoning	-0.0343	Jiangxi	0.0145	Yunnan	0.0114
Shanghai	-0.0145	Henan	0.0037	Shaanxi	0.0185
Jiangsu	0.0091	Hubei	0.0107	Gansu	0.0074
Zhejiang	0.0006	Hunan	0.0087	Qinghai	-0.0025
Fujian	0.0097	Shanxi	0.0049	Ningxia	0.0001
Shandong	-0.0080	Inner Mongolia	-0.0021	Xinjiang	-0.0023
Guangdong	-0.0028	Guangxi	0.0112		
Hainan	-0.0021				

In addition, the relationship between foreign trade and FDI on economic development for 30 Chinese provinces using individual regression model is organized as follows. Due to the large amount of data, only those provinces that pass the significance test are shown in the paper. From the results of the regression estimation of individual fixed effects variable coefficient model, the analysis is carried out mainly from the following aspects:

1. The impact of 30 regions on the economy in terms of structure from the value of β_{1i}.

Table 8 β_{1i} Parameter Estimation in Individual Fixed Coefficient of Variation Panel Model

Rank	parameter	β_{1i}	
		Coef.	t-Stat
1	Guangdong	0.3778***	(4.5769)
2	Shandong	0.3276***	(3.1712)
3	Zhejiang	0.2908***	(3.3197)
4	Shanghai	0.2584***	(3.7444)
5	Jiangsu	0.2477***	(3.4558)
6	Fujian	0.2309*	(1.8746)
7	Guangxi	0.2282*	(1.7276)
8	Liaoning	0.2148*	(1.8969)
9	Jilin	0.2104**	(2.3013)
10	Jiangxi	0.1945**	(2.2850)
11	Beijing	0.1838***	(2.9125)
12	Hebei	0.1615**	(2.1805)
13	Sichuan	0.1570***	(3.2977)
14	Xinjiang	0.1325*	(1.8210)
15	Gansu	0.1315**	(2.3800)

Note: ***, **, * are significant at 1%, 5%, 10% level respectively

The value of β_{1i} is the coefficient value of foreign trade of each province in the formula, which indicates the degree of economic impact of foreign trade of 30 provinces. Different value of β_{1i} leads to different impacts of foreign trade of 30 provinces. After sorting β_{1i} for all provinces in Table 8, it can be seen that the coefficients of Guangdong, Shandong are greater than 0.3. It means that each 1 percent increase in TRADE, GDP will grow by more than 0.3 percent. This is a significant advantage in promoting GDP growth. Besides, all provinces that passed the test have test coefficients of 0.13 or more. Foreign trade also has a positive impact on the development of the local economy.

It is worth noting that of the 15 provinces that have passed the test, 9 belong to the eastern region, and there are 3 provinces in the middle and the western region, respectively. This is because the eastern region is a coastal area with convenient shipping and transportation, which lowers the production cost. It helps the eastern region to have comparative trade advantages, also makes the economic foundation of the eastern region better with the supporting facilities more perfect, thus promotes a virtuous circle of trade development. It also shows that China's development is uneven. Therefore, if we want to reduce the differences between regions, the middle and western regions should flexibly use various methods to promote trade.

2. The impact of 30 regions on the economy in terms of structure from β_{2i}.

Table 9 β_{2i} Parameter Estimation in Individual Fixed Coefficient of Variation Panel Model

Rank	parameter	β_{2i}	
		Coef.	t-Stat
1	Shaanxi	0.6792***	(2.6895)
2	Hubei	0.3623**	(2.1083)
3	Henan	0.3442***	(5.4190)
4	Hebei	0.2063*	(1.9016)
5	Sichuan	0.1290***	(5.7958)
6	Anhui	0.1276*	(1.8113)
7	Chongqing	0.1116***	(3.8001)
8	Tianjin	0.0956*	(1.7815)
9	Yunnan	0.0823***	(2.8362)
10	Shanxi	0.0733*	(1.8969)
11	Liaoning	0.0564*	(1.9692)

Note: ***, **, * are significant at 1%, 5%, 10% level respectively

The value of β_{2i} in the formula indicates the coefficient value of FDI in each region, and therefore indicates the degree of impact of FDI on the economy of each region. The ranking of β_{2i} for all provinces in Table 9 shows that FDI in Shaanxi has the largest positive impact on economic growth, with each 1 percent increase in FDI causing a 0.6792 percent increase in GDP, respectively. The role of FDI in promoting economic growth is very important. The coefficients of Hubei, Henan, and Hebei are all greater than 0.2, which also means FDI has a significant contribution to the growth of the local economy. In terms of foreign direct investment, there is little difference among the three regions. The eastern, middle and western regions have 3, 4, and 4 provinces, respectively. This may be related to the catalog of advantageous industries for foreign investment in middle and western regions formulated and promulgated by China in 2000, and the projects in the catalog enjoy preferential policies. In addition, China has also formulated several preferential foreign policies to attract foreign investment in the middle and western regions. In addition, the cost of labor and land in the east has gradually increased, which also makes the inflow of foreign capital gradually offset to the middle and western regions.

3. Sichuan, Hebei and Liaoning may become the bright spot of China's future development.

Although the development of the country needs to be fully perfected, the strategy of getting rich first is also necessary. For example, from the country's perspective, it is necessary to take advantage of the coastal provinces' convenience to promote the continent's economic development once the economic base is available. On the other hand, when integrated

development encounters difficulties, it is necessary to highlight the provinces and cities that are easy to develop. Only in this way can more efficient growth be achieved. Combining the two tables above, it is more obvious to analyze that Sichuan, Hebei, and Liaoning have better economic development than other provinces in terms of foreign trade and FDI. The pulling effect of FDI and foreign trade on the economy are both more obvious.

The rapid economic development of various provinces in eastern China is attributed to establishing four special economic zones along the coast. These four special economic zones take the Export-oriented Economy as the development goal and encourage foreign investment through tariff reduction and exemption, the introduction of advanced technology and other measures. Referring to the strategy of the eastern region, the middle and western regions can also drive the development of the surrounding regional economy by developing the economy of representative cities. As the provincial capital of Sichuan, Chengdu is committed to building an international gateway hub and an inland open economic highland. In 2020, the foreign direct investment reached 2.55 billion US dollars, ranking first in the middle and western regions. Taking Chengdu as the central point of the development of the west of region, it can drive the surrounding cities to attract foreign investment and economic development through the diffusion effect.

Hebei and Liaoning are important parts of the Bohai Rim Economic Zone. The belt and road initiative is the golden opportunity for the development of the Bohai economic circle. Giving full play to the advantages of ports, industries, science and technology in the region, accelerating the development and building of the region’s economic belt, realizing the transformation of old and new kinetic energy and the transformation of economic development mode is of great significance to improve the quality of economic growth in the north.

6 CONCLUSION

In the 70 years since the establishment of China's reform and opening up, the development of foreign trade has made large achievements in terms of scale growth, structural upgrading and market expansion. Once having a total import and export trade of only US$1.13 billion in 1950, China has become the world's largest exporter and the second largest importer. China's foreign trade policy has also evolved from a protective trade policy under the initial state-planned economic system, through a gradual process of trade liberalization, to the current high-level, all-round opening policy oriented to high-quality development. China's growth history is an object of reference for developing countries.

This paper uses the panel data model to analyze the foreign trade, FDI, and economic development of 30 provinces in China from 2001 to 2020. All in all, it is concluded that there is a positive correlation between foreign trade, FDI, and economic development, and China's economic growth rate remains at a high level. According to the established regression equation, it is found that the foreign trade coefficient of 0.1242 is greater than the FDI coefficient of 0.0533, which shows that for China, the pulling effect of foreign trade on economic growth is more remarkable than FDI.

However, due to China's vast territory, the economic development mode and development level between different provinces and cities are very different. In different regions, the relationship between FDI, foreign trade and economic growth has their own characteristics. From the data results of regression analysis of various provinces, there are significant differences in foreign trade, FDI, and economic development. As far as the eastern provinces are concerned, the economy is mainly positively affected by foreign trade. For some middle and western provinces, FDI can positively affect their economic growth, which both verify the argument in the theoretical background. It is worth noting that the impact of foreign trade and FDI on the economic development of many provinces is not significant, which may lead to the instability of China's overall foreign economic growth, which should be paid attention to by relevant government departments.

6.1 Limitation

This thesis has some limitations in the study of China, and there are many factors that affect economic development. For example, besides FDI, import, and export considered in the thesis, they include labor force, technological progress, domestic capital, national policies and other political and economic factors. Therefore, this thesis only selects relevant elements about the external economy. Thus it affects the accuracy of the conclusion to some extent. In addition, due to the difficulty of collecting data from 30 provinces and cities, we do not analyze the "crowding-in" or "crowding-out" effect of FDI on domestic investment in each region of China. These are also essential aspects of the impact of FDI and foreign trade on economic growth, which need to be studied in-depth to reveal the relationship between FDI, foreign trade and economic development in each region of China more comprehensively.

6.2 Recommendation

According to the empirical results, some suggestions for the future development of each province are put forward:

(1) Actively take various measures to attract foreign investment in the middle and western regions, mainly to improve the investment environment in the west and middle regions to reduce the regional economic differences. The government should strengthen the cooperation among the eastern, middle, and western regions. The middle and western regions can also drive the development of the surrounding regional economy by developing the economy of representative cities. Also, the west and middle regions are rich in resources, such as mineral resources, land resources, energy resources, etc. Local governments can develop these high-quality resources to alleviate the unbalanced development of foreign direct investment and foreign trade in China.

(2) Strengthen the infrastructure construction in the middle and western regions . Create conditions for undertaking good industrial transfer from the east. Due to the geographical environment and government policies, the infrastructure in the

middle and western regions is lagging behind, which restricts the development of local economy. The middle and western regions should seize the development opportunities brought by the "Belt and Road" strategy to accelerate infrastructure construction. At the same time, the middle and western regions need to seize the opportunity of industrial transfer to realize the adjustment and upgrading of industrial structure, and give full play to local comparative advantages to truly transform resource advantages into economic advantages and promote significant economic growth.

(3) The government should formulate differentiated trade policies according to local conditions and fully use the complementary and mutually promoting relationship between FDI and foreign trade. At the same time, the local government should also improve efficiency, reduce the cost of foreign exchange and provide a convenient process for handling various business procedures.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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