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Research on the Impact of Market Maturity on Local Import and Export Trade

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Abstract. Due to many endogenous problems in the market maturity, it is impossible to accurately judge its impact on import and export trade. By constructing the panel fixed effect model and other methods, this paper provides more insights for studying the impact of market maturity on import and export trade. The results of this paper are as follows: (1) The market maturity can significantly promote import and export trade. Compared with the central and western regions, the import and export trade in eastern China is more easily affected. (2) In such a circumstance, there are three mechanism variables including environmental pollution, foreign direct investment, and urbanization, in which environmental pollution has a negative effect, while foreign direct investment and urbanization have a positive effect. On this basis, policymakers should combine the development of import and export trade with the marketization level, and take environmental pollution, foreign direct investment, and urbanization into account.

Keywords: Market Maturity; Import and Export Trade; Environmental Pollution; Foreign Direct Investment; Urbanization.

1. Introduction

On July 13, 2023, the State Council Information Office of the People's Republic of China held a press conference. According to Lv Daliang, the relevant person in charge of the General Administration of Customs, the import and export of China's goods trade increased by 2.1% year-on-year in the first half of this year, reaching 9.76 trillion yuan and 10.34 trillion yuan in the first and the second quarter respectively, which is a record high in the same period. Thus, the import and export of foreign trade improved steadily under expectations. Meanwhile, the industrial cooperation between China and countries along the Belt and Road Initiative gets closer with the prominent interconnection effect. Besides, the import and export increased by 9.8% year-on-year, 7.7 percentage higher than the overall growth rate, accounting for 34.3% of the total import and export volume. China's import and export to other members of the *Regional Comprehensive Economic Partnership (RCEP)* rose by 1.5% year-on-year, and its contribution rate to China's foreign trade growth exceeded 20%.

Based on the data of the first half of 2023, when the COVID-19 pandemic is gradually controlled, the relevant import and export systems are established and optimized with the increasingly complete logistics supply chain, China's foreign trade is stably promoted nowadays. Hence, it is of great benefit to study the impact of market maturity on import and export trade, so as to build a more comprehensive market system and promote more prosperous trade.

Import and export trade, known as foreign trade, generally refers to the exchange of goods and services between two countries, mainly including import trade and export trade [1]. Market maturity means the comprehensive development of the market environment, market subject, market scale, and market operation, which is a relative concept that has been improved over time. It is also a vital indicator to measure and distinguish market development [2]. In normal situations, market maturity can be measured by market laws and regulations, market scale, and market system.

At present, the existing related research can be divided into three categories according to time, that is, the research from the perspective of the past, present, and future to respectively study the relationship between market maturity and import and export trade. In the past, a specific historical

period often promoted the emergence of different market policies, thus affecting the development of foreign trade. During the Great Depression in the United States in the 1930s, collective painful memories overwhelmed people, and the world trading system was destructed. Meanwhile, the increasing American tariffs triggered a large trade war, and Britain's trade retaliation forced more countries to be involved in this disaster. "The trade war during the Great Depression not only destroyed the global trade system, but also became the trade and economic motivation that induced the Second World War, even emerged as the early root of global trade protectionism" [3]. As for China, guided by the policy of "planned economy as the mainstay and market regulation as the supplement" from 1978 to 1986, a series of reforms have been implemented to decentralize the right to operate foreign trade [4]. Some achievements have been made in this stage, laying a solid foundation for the Chinese development of the open economy.

Currently, up against the in-depth development of economic globalization, the promotion of market infrastructure, the rapid progress of e-commerce platforms, and the transformation of the labor force to be knowledge-based undoubtedly paved the way for import and export trade. At the same time, the prosperity of import and export trade has contributed to the market maturity. Import and export trade can enhance the international flow of commodities and greatly expand their circulation range. Given that trade and logistics are intertwined, the swift trade development also directly drives the advancement of the logistics industry [5]. In addition, the technology spillover brought by imported high-tech products gives a country sufficient absorption flexibility and innovation space, thus promoting the total factor productivity and improving the domestic economic reform to make greater progress. Besides, export trade can boost the high-quality development of the domestic economy by strengthening the quality of the goods [6]. Therefore, with the vigorous development in all aspects, the market maturity and import and export trade are interrelated and promote each other.

As for the future, with the proposal of RCEP, China will have greater trade potential. "In addition to seizing the opportunity of signing free trade agreements, we should implement trade platform construction, trade cooperation, and trade policy to promote regional integration and achieve efficient, free, and convenient international trade" [7]. Moreover, the COVID-19 epidemic has left a major impact on the stability of global foreign trade, prompting international cooperation to build a digital trade system [8]. This will help to develop a new mode of surface trade and carry out international cooperation in new formats.

Through the literature review, it can be found that most of the existing studies focus on the relationship between individual factors that promote market maturity (such as labor force, industrial chain, RMB exchange rate, etc.) and import and export trade. However, rare research combines them into comprehensive indicators including market scale, system, and mechanism. Then, what is the relationship between the overall market maturity and import and export trade?

Considering the blank of the existing research, this paper has the following innovations. On the one hand, based on the above contents, this paper summarizes the influencing factors of import and export trade, and directly studies the impact of the market maturity on import and export trade, so as to make up for the shortcomings of the research. On the other hand, this paper will comprehensively measure the market maturity of each region in China in recent years from the aspects of market scale, market laws and regulations, market system, etc. Meanwhile, regression analysis will be conducted on the import and export data of the same period to draw corresponding policy enlightenment and conclusions.

2. Research Hypotheses

In the past few years, the COVID-19 pandemic and trade friction have impacted the international trade market, which has greatly affected the overall level of China's import and export trade. Hence, it is necessary to study the influence of market maturity on import and export trade.

When the market is in the early development stage, there is a small market scale where goods types are insufficient with undesirable quality, and people's purchasing power needs to be improved. At the same time, the market system can not be linked in time, and the labor force and production factors fail to be fully integrated. In addition, the laws, regulations, and regulatory measures of the market are imperfect, for which a stable market is hard to form. Thus, foreign trade is doomed to be weakened.

Based on the above facts, this paper puts forward the first hypothesis.

Hypothesis 1: the market maturity can promote import and export trade.

Nowadays, although China has developed into the second-largest economy in the world, unbalanced development still exists, and cities in different regions obviously differ in geographical location, resource endowment, and development [9]. For example, eastern China can rely on a complete industrial system and take technological innovation as the main driving force to accelerate the development of industrial informatization and improve the economic added value of industrial development [10]. It can be seen that in the originally developed provinces with a certain trade foundation, the level of industrialization, medicine, and medical care is relatively high, the number of trade platforms is dominant, and the transportation conditions are convenient, so mature market conditions can be relied on to rapidly achieve economic development and a large amount of foreign trade. Against China's economic transformation, supply-side reform, Sino-US trade friction, etc., the gap between the GDP growth rate of the eastern region and that of other regions is widening year by year [11], and the eastern region has become the main force of China's foreign trade thanks to its naturally superior natural conditions. As long as the market maturity is improved, the import and export trade will flourish.

Meanwhile, the central and western regions lag far behind the eastern regions in terms of foreign trade scale and quality. These provinces are at a disadvantage regarding labor force, income, medical and health conditions, etc. Even though the market is constantly developing and maturing, there are not enough hardware conditions to ensure the continuous high-quality foreign trade of these provinces. At present, the eastern coastal areas have become urban economic belts regardless of urban and rural areas, and the rural areas in the urban economic belts have been internal components of the urban economy. However, in the vast central and western regions, the rural population is losing and the rural areas become depressed [12]. It can be inferred that the provinces in central and western China have relatively little room for improvement in import and export trade. Based on the above viewpoints, the second hypothesis is put forward.

Hypothesis 2: Compared with the central and western regions, the import and export trade in the eastern region is more easily affected by the market maturity.

At present, China's economy is developing by leaps and bounds in an all-round way. However, in the rapid economic growth with abundant material wealth, some serious environmental problems are increasingly exposed, and the environmental problems that appear in the industrialization of developed countries are concentrated in a short period in China [13]. For example, the occupation of resources and the environment by building transportation infrastructure as well as a large amount of solid waste, smoke, and dust will cause a certain damage to the local ecological environment [14]. With the large increase in urban population, environmental pollution will increase [15]. All these will hinder the production, storage, transportation, and sales of products. Thus, the third hypothesis can be proposed:

Hypothesis 3: The environmental pollution index has a negative moderating effect on how the market maturity influences China's import and export trade.

Since the Third Plenary Session of the Eleventh Central Committee, China has persisted in opening up to the global world and attracted a large number of foreign investments. In recent years. China is facing considerable downward pressure on the economy. In the critical period of economic restructuring, the introduction of foreign direct investment can not only bring the required capital, technology, and advanced management experience to economic growth, but also promote the growth

of export trade through relevant mechanisms, thus driving the stable and efficient growth of China's economy [16]. Besides, foreign investment is beneficial for Chinese enterprises to strengthen their ties with foreign countries, integrate into the world to a greater extent, and conform to the trend of economic globalization. Therefore, hypothesis 4 is put forward.

Hypothesis 4: Foreign investment has a positive moderating effect on how the market maturity influences China's import and export trade.

In addition, although urbanization does not affect the maturity of the market environment, it can play an indirect role by affecting residents' consumption. Urbanization can promote the development of the tertiary industry, extend more industries and enterprises, expand employment, and solve residents' employment. Urban households can also improve infrastructure, reduce living costs, and increase disposable income, thus expanding market demand [17]. Therefore, hypothesis 5 can be put forward. The urbanization improvement has a positive moderating effect on how the market maturity influences China's import and export trade.

3. Research Method

This study uses data from the National Bureau of Statistics and the National Statistical Yearbook from 1990 to 2022. The collected data are at the provincial level in China, including 30 provinces, ethnic autonomous regions, and municipalities under the Central Government, excluding Tibet, Hong Kong, Macao, and Taiwan. Because some indexes have missing values, this paper does not deal with them, so 600 samples can be obtained at last.

The explained variable in this paper is import and export trade, which is mainly measured by the import and export trade volume in RMB and US dollars; The explanatory variable is the market maturity, which is mainly measured by the market index and generally includes five aspects, including the relationship between government and market, the development of non-state-owned economy, the development of product market, factor market, and market intermediary organizations, and legal environment [18].

The mechanism variables include environmental pollution, foreign investment, and urbanization. Environmental pollution is measured by the environmental pollution index, which mainly includes the total amount of wastewater discharge, sulfur dioxide discharge in the waste gas, and the amount of general industrial solid waste. Foreign investment is measured by foreign investment in RMB and US dollars, while urbanization is measured by the ratio of urban resident population to resident population.

Because import and export trade and market maturity are affected by multiple factors, this paper ignores irrelevant variables such as total population, economic base, income, employment, and traffic of each province.

Because there may be endogenous problems in the causal identification of the model, the role of non-tradable shares reform in market maturity proposed by China in 2005 can be used as a natural experiment to reduce the model endogeneity. If assuming that this policy is exogenous, a natural experiment can be established with market maturity as the object and build a DID model. As for the non-tradable shares reform, the experimental group is the provinces where the first pilot enterprises are located (4 in total, including Beijing, Shanghai, Hebei, and Hunan); the control group is the provinces without pilot enterprises (26 in total, including Tianjin, Shanxi, Inner Mongolia Autonomous Region, Liaoning, Jilin, Heilongjiang, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hubei, Guangdong, Guangxi Zhuang Autonomous Region, Hainan, Chongqing, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia Hui Autonomous Region, and Xinjiang). The time node of the experiment was 2005 when the non-tradable shares reform was formally proposed by the government.

In addition, the role of completing the Three Gorges Dam in market maturity can be used as a natural experiment to reduce the model endogeneity. If assuming that this event is exogenous, a natural

experiment can be conducted with market maturity as the object and build a DID model. As for the impact of the Three Gorges Dam, the experimental group is the provinces through which the Yangtze River Basin passes (8 in total, including Hubei, Hunan, Shanghai, Jiangxi, Anhui, Chongqing, and Sichuan); the control group is the provinces that do not belong to the Yangtze River Basin (22 in total, including Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia Autonomous Region, Liaoning, Jilin, Heilongjiang, Zhejiang, Fujian, Shandong, Henan, Guangdong, Guangxi Zhuang Autonomous Region, Hainan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia Hui Autonomous Region, and Xinjiang). The time node of the experiment was 2006 when the Three Gorges Dam was built and taken into use.

Therefore, this paper mainly uses two regression models, namely, the panel fixed effect model and the DID model. The panel fixed effect equation is:

$$Trade_{it} = \alpha + \alpha Marketization_{it} + \beta X_{it} + \gamma Mediation_{it} + year_t + v_i + \mu_{it}$$

i and t represent province and time respectively, Trade represents import and export trade, Marketization represents the market maturity, X represents the control variable, Mediation represents the mechanism variable, year represents the time trend effect, v represents individual effect, and u represents residual error.

4. Analysis of Empirical Results

The following is the empirical analysis of this paper. First, the regression analysis results of the main model are as follows:

Table 1. Regression Results of Main Model

	(1)	(2)	(3)	(4)
Model	Fixed Effect	Random Effect	Fixed Effect	Random Effect
Explained Variable	Trade volume of import and export (RMB)	Trade volume of import and export (RMB)	Trade volume of import and export (USD)	Trade volume of import and export (USD)
Marketization	2189.383***	2109.102***	351.354***	337.042***
	(14.353)	(13.710)	(13.802)	(13.053)
Control Variable	Yes	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes	Yes
Individual Effect	Yes	Yes	Yes	Yes
N	600	600	600	600

According to Table 1, the impact of marketization on import and export trade volume is significant at the level of 1%. Moreover, the absolute value of the trade volume coefficient in RMB is between 2109.102 and 2189.383, which indicates that every increase of 1 in the marketization index will increase the provincial import and export trade volume by an average of [210.9102, 218.9383] billion yuan. The absolute value of the trade volume coefficient in US dollars ranges from 337.042 to 351.354, which indicates that every increase of 1 in the marketization index will increase the provincial import and export trade volume by an average of [33.7042, 35.1354] billion US dollars. This proves Hypothesis 1 that the market maturity can promote import and export trade.

Next, this paper divides China into eastern region, central region, and western region (The eastern region includes Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Guangxi Zhuang Autonomous Region and Hainan; The central region includes Shanxi, Inner Mongolia Autonomous Region, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei and Hunan; The western region includes Chongqing, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia Hui Autonomous Region, and Xinjiang) as samples of the heterogeneity test, with the regression results as follows.

Table 2. Regression Results of Heterogeneity Test for Different Samples

Region	Eastern Region		Central Region		Western Region	
Explained Variable	Trade volume of import and export (RMB)	Trade volume of import and export (USD)	Trade volume of import and export (RMB)	Trade volume of import and export (USD)	Trade volume of import and export (RMB)	Trade volume of import and export (USD)
Marketization	4973.806***	802.246***	679.455***	105.190***	589.597***	89.484***
	(14.801)	(14.046)	(16.696)	(17.084)	(10.308)	(10.267)
Control Variable	Yes	Yes	Yes	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes	Yes	Yes	Yes
Individual Effect	Yes	Yes	Yes	Yes	Yes	Yes
N	240	240	180	180	180	180

Table 2 shows the results of the heterogeneity test. The impact of marketization on import and export trade volume remains significant at the level of 1% in different regions.

For the eastern region of China, the absolute values of trade volume coefficients in RMB are 4973.806, indicating that for every increase in the marketization index of eastern provinces, the import and export trade volume will increase by 497.3806 billion yuan respectively on average. The absolute value of the trade volume coefficient in US dollars is 802.246, which indicates that for every increase in the marketization index in eastern provinces, the import and export trade volume will increase by an average of 80.224.6 billion US dollars respectively.

For the central and western regions of China, the absolute values of the trade volume coefficient in RMB are 679.455 and 589.597 respectively, indicating that for every increase in the marketization index of western provinces, the import and export trade volume will increase by an average of 67.9455 and 58.9597 billion yuan respectively; The absolute values of trade volume coefficient in US dollars are 105.190 and 89.484 respectively, which shows that for every increase of marketization index in western provinces, the average import and export trade volume will increase by 10.519 and 8.9494 billion US dollars respectively.

The import and export trade volume in the eastern region is more marginally affected by the market maturity, which is about 63.2% and 74.6% higher than that in the central and western regions respectively. This proves Hypothesis 2 that compared with the central and western regions, the import and export trade in the eastern region is more easily affected by the market maturity.

Then, this paper analyzes the mechanism. First, the interaction term between the environmental pollution index and marketization is constructed, and the adjustment effect of the environmental pollution mechanism is analyzed. The regression results are as follows:

Table 3. Regression Results of Mechanism Analysis of Environmental Pollution

Model	Fixed Effect	Random Effect	Fixed Effect	Random Effect
Explained Variable	The import and export trade volume (RMB 100 million)	The import and export trade volume (RMB 100 million)	The import and export trade volume (USD 100 million)	The import and export trade volume (USD 100 million)
Environmental Pollution Index * Marketization	-477.300***	-582.950***	-61.119***	-77.748***
	(-5.414)	(-6.496)	(-4.374)	(-5.432)
Control Variable	Yes	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes	Yes
Individual Effect	Yes	Yes	Yes	Yes
N	390	390	390	390

According to Table 3, the environmental pollution index for market maturity has a significant impact on import and export trade at the level of 1%.

With RMB as the unit, the absolute value of the coefficient of import and export trade volume is [477.300, 582.950], which indicates that for every increase of environmental pollution index by 1, the promotion effect of the market maturity on import and export trade will decrease by [47.730, 58.295] billion yuan. With the dollar as the unit, the absolute value of the coefficient of import and export trade volume is [61.119, 77.748], which shows that for every increase in the environmental pollution index, the promotion effect of market maturity on import and export trade will decrease by [6.111.9, 7.774.8] billion dollars.

Table 4. Regression Results of Mechanism Analysis of Foreign Direct Investment

	(1)	(2)	(3)	(4)
Model	Fixed Effect	Random Effect	Fixed Effect	Random Effect
Explained Variable	Trade volume of import and export (RMB)	Trade volume of import and export (RMB)	Trade volume of import and export (USD)	Trade volume of import and export (USD)
Foreign Direct Investment * Marketization	1.271***	1.207***	0.210***	0.199***
	(21.261)	(19.936)	(21.087)	(19.490)
Control Variable	Yes	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes	Yes
Individual Effect	Yes	Yes	Yes	Yes
N	550	550	550	550

This proves Hypothesis 3 that the environmental pollution index has a negative moderating effect on how the market maturity influences China's import and export trade.

Then, this paper constructs the interaction term of foreign direct investment and marketization, and analyzes the adjustment effect of the foreign direct investment mechanism. The regression results are as Table 4.

Table 4 shows that the foreign direct investment for the market maturity has a significant impact on import and export trade at the level of 1%.

With RMB as the unit, the absolute value of the coefficient of import and export trade volume is [1.207, 1.271], which indicates that the market maturity will increase [1.207, 1.271] yuan in promoting import and export trade for every increase of 1 yuan of foreign direct investment. With US dollars as the unit, the absolute value of the coefficient of import and export trade volume is [0.199, 0.210], which indicates that for every US dollar increase in foreign direct investment, the market maturity will increase [0.199, 0.210] US dollars in promoting import and export trade.

This proves Hypothesis 4 that foreign investment has a positive moderating effect on how the market maturity influences China's import and export trade.

Then, this paper constructs the interaction term of urbanization and marketization, and analyzes the adjustment effect of urbanization. The regression results are as follows:

Table 5. Regression Results of Urbanization Mechanism Analysis

	(1)	(2)	(3)	(4)
Model	Fixed Effect	Random Effect	Fixed Effect	Random Effect
Explained Variable	Trade volume of import and export (RMB)	Trade volume of import and export (RMB)	Trade volume of import and export (USD)	Trade volume of import and export (USD)
Urbanization * Marketization	2362.625***	2310.198***	380.872***	371.251***
	(17.209)	(16.703)	(16.100)	(15.497)
Control Variable	Yes	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes	Yes
Individual Effect	Yes	Yes	Yes	Yes
N	550	550	550	550

Table 5 shows that the urbanization for market maturity has a significant impact on import and export trade at the level of 1%.

With RMB as the unit, the absolute value of the coefficient of import and export trade volume is [2310.198, 2362.625], which indicates that for every increase in the urbanization index, the market maturity will promote import and export trade by [231.0198, 236.2623] billion yuan. With the dollar as the unit, the absolute value of the coefficient of import and export trade volume is [371.251, 380.872], which indicates that for every 1 increase in the urbanization index, the promotion effect of the market maturity on import and export trade will increase by [37.1251, 38.0872] billion US dollars.

This proves Hypothesis 5 that the urbanization improvement has a positive moderating effect on how the market maturity influences China's import and export trade.

5. Conclusion

This paper provides new evidence for the influence of market maturity on import and export trade. In other studies, the explanation of their relationship is generally vague with different viewpoints such as “the Pilot Free Trade Zone can improve the marketization by promoting the introduction of the foreign capital, reducing trade barriers of commodities, transforming government functions, and other institutional innovations” [21]. On the contrary, through a series of regression analyses and endogenous experiments, this paper proposes various views on the influence of market maturity on import and export trade.

First of all, the market maturity can promote import and export trade, with an average promotion of [210.9102, 218.938.3] billion yuan, that is, [33.7042,35.1354] billion U.S. dollars, which further emphasizes that importance should be attached to the market maturity in foreign trade.

The practical significance of Hypothesis 1 is that the development of import and export trade should rely more on the development of market construction. This means that relevant departments should strictly regulate the market order, such as cracking down on fake and shoddy products, anti-monopoly, and severely punishing tax evasion. At the same time, we should do a good job in market information services, so as to provide consumers with timely and effective information, promoting the prosperity of market activities.

Secondly, similar to the research of Wei Feng et al. (2023), this paper holds that compared with the central and western regions, the import and export trade in the eastern region are more susceptible to market maturity. During the virus spread in the COVID-19 pandemic (2020-2022), the areas with high economic resilience were mainly distributed in the western region, which showed the “northwest-southeast” pattern in the spatial distribution of resistance [22]. Hence, although the import and export trade volume in the eastern region is obviously higher than that in the central and western regions, it is vulnerable to the global economic situation and trade policies, which makes it difficult to maintain stability for a long time. This proves the validity of Hypothesis 2.

The practical significance of Hypothesis 2 is to pay more attention to the trade stability of the eastern region while ensuring stable import and export trade in the central and western regions. Besides, we should consolidate friendly exchanges with major trading countries such as “the Belt and Road Initiative” and ASEAN, while emphasizing the optimization of the foreign trade structure. The growth of high-value-added trade can also alleviate downward pressure and stabilize the long-term trade trend in the region.

Finally, this paper argues that there are three mechanism variables in the effect of market maturity on import and export trade, including environmental pollution, foreign direct investment, and urbanization. Environmental pollution will hinder import and export trade, while foreign direct investment and urbanization will promote the import and export trade.

The significance of Hypotheses 3, 4, and 5 is as follows: (1) Given the obvious trend of “rising and falling” for environmental pollution impact [14], it is necessary to increase investment in environmental pollution control and establish a strict control system to undermine the constraint of environmental pollution on import and export trade; (2) The impact of foreign direct investments on the foreign trade of the host country can be reflected in the investment pulling effect and export promotion effect [23]. In this regard, China can guide foreign investment to flow more to the primary and tertiary industries and gather in technology-intensive industries, which can not only inhibit the accumulation of excess capacity, but also maximize the use of foreign investment and promote trade development; (3) At present, the urbanization of all provinces in China has improved steadily. Under a favorable situation, more attention should be paid to rational planning of urban construction fiscal expenditure, so as to ensure the sustained and stable development of China’s commercial circulation industry [24], improve urban infrastructure construction, and make it play a greater role in promoting import and export trade.

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