

An empirical analysis of driving factors of Xi'an hub economic development

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Abstract. In order to promote Xi'an's economic development as an export-oriented hub, 7 indicators, including GDP, foreign trade volume, investment volume, passenger transport volume, freight volume, post and telecommunications business income, and the number of industrial enterprises above designated size, are selected to analyze the development of the hub economy through multiple linear regression analysis method. The results show that foreign trade, passenger traffic and post and telecommunications business revenues are significant to the economic development of Xi'an hub. However, the freight volume, investment and the number of enterprises above designated size have not passed the inspection. According to self-organization theory, the countermeasures for Xi'an to develop the hub economy are puts forward.

Keywords: Hub economy, Driving factors, Xi'an.

1 Introduction

Xi'an, as an inland port city, the forefront of the Silk Road Economic Belt, the forefront of the Western Development and a national central city in the Guanzhong Plain urban agglomeration, has geographic advantages of developing a hub economy. Since "the Belt and Road" initiative was put forward, Xi'an has built the "Western Europe" railway transport channel and the Xi'an air transport channel, and has achieved seamless connection with Lianyungang, Qingdao and other coastal ports for cargo transshipment. Driven by the port economy, the development of the hub economy has strong feasibility. Building a hub economy is not only an opportunity for Xi'an, but also a mission. With a weak industrial foundation, not particularly strong technological strength, lack of supply in the hinterland, and fierce competition from similar cities, if Xi'an wants to stand out in the national economy and develop into an economic metropolis, it needs to rely on port platforms and logistics according to its city positioning and comparative advantages. Channels, attracting industry gathering and integration, occupying the highest point of the economy, creating a hub economy, and realizing the overall improvement of the overall economic strength of Xi'an.

2 The theoretical basis of hub economy

The hub economy was proposed by Wang Ming. He believed that a region could not rely on industry and consumption, but rely on the logistics industry to lead economic development. Subsequently, research on the hub economy increased rapidly. Xu Kangning believes that the hub economy is based on transportation, logistics, information and other hub platforms as the carrier to strengthen the agglomeration and radiation of economic activities and information flow, and seek a new economic model that drives development by innovation. , The emphasis is on the development of a flow economy. Wu Wenhua, deputy director of the National Development and Reform Commission, pointed out that the key to the development of the hub economy lies in the creation of a hub-preferred industrial system. Based on the economic characteristics of regional transportation hubs, combined with urban resource endowment conditions and development goal orientation, based on the coupling relationship between transportation and industry, the selection is suitable for local development. The industry, using the advantages of high-quality and low-cost transportation services, attracts leading enterprises in the core industries of the hub economy, accelerates the development of industrial chains, and builds preferred industrial clusters in transportation hubs. It can be seen that the development of the hub economy is inseparable from excellent traffic conditions, a good industrial foundation and a high-quality service system.

The development of the hub economy needs to go through the transportation hub stage and the port economy stage. The transportation hub is a whole composed of multiple transportation methods and their associated equipment. It is the intersection of the transportation network. It is a collection of internal and external transportation and related operations in the area. Its formation is mainly composed of the location and transportation of the city. The facility decision is the basis for the economic development of the hub. The port economy is the use of the port's functional advantages, the port as the gateway, the infrastructure as the foundation, the port area as the center, and the hinterland as the backing to form an industry clustered regional economy with certain characteristics that can produce economies of scale and external effects. The primary stage and support of the development of the hub economy.

The symbol of the formation of the hub economy from the perspective of industry is that the proportion of the hub's leading industries has increased significantly, the industrial agglomeration is obvious, the number of clusters has increased, and the degree of related industries has been high; from the perspective of the radiant driving force, the economic aggregate has increased, driven and radiated. The economic environment is significantly improved; from the perspective of the transportation system, the flow of goods and passengers has increased significantly, the degree of convenience is high, and the transportation cost advantage is obvious.

3 Factors influencing the economic development of Xi'an hub

The development of the hub economy is usually determined by the organic combination of commerce, hub, industry, and tourism. Here, select GDP, total foreign trade, foreign investment, post and telecommunications business, freight, passenger traffic, and industrial enterprises above designated size. This indicator reflects the economic construction status of the Xi'an hub.

(1) GDP. From 1990 to 2018, GDP of Xi'an has a good development trend, and the growth rate has increased year by year. From the perspective of industrial composition, the service industry accounts for more than the industry, and the gap has been increasing year

by year. Especially since 2014, the service industry has developed more rapidly and fully. It shows that Xi'an's industrial base needs to be improved.

(2) Total foreign trade. The total foreign trade volume of Xi'an is not high, but the development speed is relatively fast. In 2010, the dependence on foreign trade was 21.69%. It was gradually improved after the 'Belt and Road' initiative was put forward. It began to develop rapidly in 2016. In 2017, the dependence on foreign trade of Xi'an was higher than the national dependence on foreign trade, and it increased to 39.56% in 2018, which was slightly lower. In Zhengzhou City, it is nearly 14% higher than Chongqing City.

(3) Foreign investment. Foreign investment in Xi'an has increased year by year. The actual use of foreign investment has increased from US\$1.57 billion in 2010 to US\$635,000 in 2018, with an average annual growth rate of 19.13%. The investment layout is mainly distributed in Xi'an High-tech Zone, Economic Development Zone, Xixian New District, etc. Xixian New District where the airport is located and Xi'an International Port District, where the dry port is located, only take up 9% of the total investment. The port area's economy is relatively hinterland. Form a competitive advantage.

(4) Total post and telecommunications business. The total volume of post and telecommunications business in Xi'an has increased year by year, with an average growth rate of 36.73%, especially after 2014, the growth rate has accelerated. The increase in the total volume of post and telecommunications business is mainly the result of the approval of the pilot cities for cross-border trade e-commerce services, the launch of the "foreign cargo terminal" Xi'an e-commerce platform, the operation of the "Chang'an" train, and the increase in air routes from the airport to the new city.

(5) Freight volume. The freight volume in Xi'an was 340 million tons in 2010, and reached the highest level of 500 million tons in 2013. Afterwards, it experienced small fluctuations. In 2016, it fell sharply to about 240 million tons. There has been a slight rebound since then, but the freight volume in 2019 is still The freight volume cannot reach the level of 2010, and the reduction of freight volume is not conducive to the construction of Xi'an hub economy. From a certain perspective, industrial agglomeration cannot form a scale, or there is no advantage in freight transportation.

(6) Passenger volume. Passenger traffic in Xi'an fluctuated between 2010 and 2018. In 2013, it showed a steady growth trend. After that, there were two obvious fluctuations. After a small increase in 2015, a sharp drop in 2016, and then a small increase again. From the perspective of the entire period, passenger traffic in 2018 was only 84.32% of 2010. The decrease in passenger traffic in Xi'an indicates that competition in inland cities is fierce, and the gathering capacity and attractiveness of people of Xi'an are relatively declining.

(7) Industrial enterprises above designated size. The number of industrial enterprises above designated size in Xi'an has increased year by year, from 793 in 1998 to 1,474 in 2018, with an average growth rate of 3.14% throughout the period. After "the Belt and Road" initiative was put forward, the average annual growth rate reached 6.50%. However, the total scale of Xi'an enterprises is relatively low. In 2017, it was only 20.99% of Chongqing's. This shows that Xi'an hub economic development itself lacks an industrial foundation and the attraction of enterprise gathering.

4 Empirical analysis

4.1 Hypothesis

Hypothesis 1: The larger the total amount of foreign trade, the faster the hub economy will develop, and the development of foreign trade will promote the hub economy;

Hypothesis 2: The greater the amount of foreign investment, the faster the hub economy will develop, and foreign investment will promote the hub economy;

Hypothesis 3: The greater the passenger volume, the faster the hub economy will develop, and the passenger volume will promote the hub economy;

Hypothesis 4: The greater the freight volume, the faster the hub economy develops, and the freight volume promotes the hub economic development;

Hypothesis 5: The larger the total volume of post and telecommunications business, the faster the hub economy develops, and the total volume of post and telecommunications business promotes the development of the hub economy;

Hypothesis 6: The more industrial enterprises above designated size, the faster the development of the hub economy, and the number of industrial enterprises promotes the development of the hub economy.

4.2 Variable design and modeling

GDP is used to represent the economic development of the hub of Xi'an as the explained variable. Select foreign trade volume TRD, foreign investment volume INV, freight volume FRT, passenger volume PSV, total post and telecommunications business PTS, and number of companies ENT as explanatory variables, as shown in Table 1.

Table 1. Selection index and meaning.

Variable symbol	Variable	Implication
GDP	GDP of Xi'an	Economic development scale
TRD	Total foreign trade volume	Foreign trade development scale
INV	Foreign investment volume	Foreign capital absorption
PSV	Passenger volume	Population mobility scale
FRT	Freight volume	Port freight scale
PTS	Post and telecommunications volume	E-commerce scale and communication foundation
ENT	Industrial enterprises above scale number	Industrial economic base

Because the logarithmic model reflects the elastic change relationship, the double logarithmic model is used for phenomenon analysis. Taking c as the intercept, representing the elastic relationship of each variable, and U as the random error term, the regression equation is constructed as follows:

Data source and sample selection. All data are from the Xi'an Statistical Yearbook. According to the availability of the yearbook data, data from 1998 to 2018 are selected to form time series data for analysis.

4.3 Empirical results and analysis

The multiple linear regression analysis was performed by Eviews6.0 software. From the perspective of the model regression effect: the fit = 0.9944, which is close to 1, and the regression effect is good; $P=0.000<0.01$, indicating that the model is very significant; $DW=1.568544$, indicating the There is no serial autocorrelation in the model.

It can be seen from Table 2 that the freight volume and the number of enterprises are opposite to the expected signs. In addition, the foreign investment volume, freight volume, and the number of enterprises above designated size failed the t-test, indicating that these variables have no significant impact or there is multiple collinearity. Testing the correlations between the variables by Eviews6.0, and it can be seen from Table3 that there is a high degree of correlation between the variables.

Table 2. Regression coefficient of the influencing factors.

	Expected symbol	Regression coefficient	T Value
Intercept	+	-3.014493	-2.490971
LNTRD	+	0.558894	4.644056
LNINV	+	0.057993	0.529528
LNPSV	+	0.276614	2.097966
LNFRD	+	-0.058205	-0.521631
LNPTS	+	0.188494	3.091168
LNENT	+	-0.336234	-1.285202

Table 3. Correlation of each variable.

	LNENT	LNFRD	LNINV	LNPSV	LNPTS	LNTRD
LNENT	1.000000	0.696377	0.856660	0.667592	0.871734	0.891134
LNFRD	0.696377	1.000000	0.867915	0.963582	0.791310	0.849667
LNINV	0.856660	0.867915	1.000000	0.848299	0.925202	0.984357
LNPSV	0.667592	0.963582	0.848299	1.000000	0.784001	0.829800
LNPTS	0.871734	0.791310	0.925202	0.784001	1.000000	0.902560
LNTRD	0.891134	0.849667	0.984357	0.829800	0.902560	1.000000

Using the stepwise regression method, first select the TRD with the highest correlation as the independent variable for regression analysis, add other variables in turn, and observe the goodness of fit of the regression model. When the explanatory variables are LNTRD, LNPTS, LNPSV, the regression equation $R^2=0.993041$, $P=0.00000$, $F=808.64$, the goodness of fit of the regression equation reaches the best.

The optimal regression equation is as follows:

$$\text{LNGDP} = -4.909988 + 0.558665\text{LNTRD} + 0.175105\text{LNPTS} + 0.262598\text{LNPSV}$$

$$(13.10912)$$

$$(3.932766)$$

$$(4.187224)$$

Therefore, only the three explanatory variables of international trade, total post and telecommunications business, and passenger traffic have passed the significance test.

According to the empirical results:

① There is a significant positive correlation between trade volume and GDP, which is in line with the expected sign. Trade volume increases by 1% and GDP increases by 0.55%. Hypothesis 1 holds.

② The amount of foreign investment is positively correlated with GDP, which is consistent with the expected sign, but the test result is not significant, and Hypothesis 2 is invalid.

③ Passenger volume and GDP are significantly positively correlated, which is in line with the expected sign. Passenger volume increases by 1% and GDP increases by 0.26%. Hypothesis 3 holds.

④ The freight volume is negatively correlated with GDP, which does not match the expected sign. Hypothesis 4 does not hold.

⑤ The total post and telecommunications business is significantly positively correlated with GDP. Post and telecommunications business increased by 1%, and GDP increased by 0.175%. Hypothesis 5 holds.

⑥ The number of industrial enterprises above designated size is negatively correlated with GDP, which does not match the expected sign. Hypothesis 6 does not hold.

The total volume of international trade, post and telecommunications business, and passenger traffic have passed the t test, showing a significant correlation with Xi'an's GDP. International trade represents the traditional trade model. The more the total, the greater the supply and demand in Xi'an and its hinterland, which will drive GDP. The bigger is, when

the trade volume reaches a certain level, it will form a virtuous circle, promote the sustainable development of GDP, and form a focus of Xi'an's economy. The development of international trade should be continuously promoted.

The total volume of post and telecommunications business represents the development of modern information and e-commerce, or a new way of trade. The larger the number of transactions in this way, the greater the driving force for GDP. Based on the epidemic, major country friction, and political geography, Xi'an should continue to increase the development of post and telecommunications business.

Passenger traffic represents the degree of passenger flow in Xi'an. The greater the flow of people, the more it can drive the development of related industries and promote cultural exchanges, thereby promoting the economic development of the hinterland. By holding special events, attracting passenger flow will help promote economic development.

However, the freight volume, the number of industrial enterprises, and the investment amount did not pass the significance test. According to the test results, it shows that Xi'an's freight volume, number of industrial enterprises, and investment have no significant impact on economic development, that is, it has not yet formed a stable and sustainable development trend, and the driving force for economic development has not been shown. Especially under the fierce competition of supply, investment, and enterprise entry in major cities in the mainland, Xi'an promotes the development of the three, and it is a difficult task to create a growth pole. It is necessary to use external forces to form development momentum and promote the development of the hub economy.

5 Xi'an hub economic development strategy

(1) Increasing the guidance and support of the government. The government and relevant departments should continue to increase policy support and financial support for external economic development. In response to the fierce competition in the development of other hub economic cities in the Mainland, create a port economic policy recession, form an international freight forwarding advantage and a regional investment advantage, and attract cargo sources Gather with enterprises to realize the gradual upgrading of the industry and the formation of the entire industry chain.

(2) Improving the business environment. Compare the business environment of Hong Kong and Shanghai Free Trade Zones, continue to replicate or innovate institutional management models under the established national macro policies, promote the construction of Xi'an electronic port, and explore customs supervision of trade liberalization, trade facilitation measures and investment, innovation and entrepreneurship, etc. Institutional reforms have further created and improved practices such as district-port linkage, multimodal transportation across customs areas, and transshipment. The Shaanxi Free Trade Zone should intensify innovation and copy successful experience, make bold attempts, continue to explore the implementation of negative list systems in insurance and finance, improve the management system of foreign capital, and increase the efficiency of foreign capital utilization.

(3) Implementing the talent strategy. In the era of innovation and development, the competition between regions is actually a competition for talents. Inland cities have introduced attractive policies to attract high-end talents. The number of universities in Xi'an ranks third in the country, but the brain drain is relatively serious. The Xi'an municipal government should adjust the talent attraction policy to retain, gather and attract high-quality talents such as scientific and technological talents, industry leaders, outstanding young talents, and enhance the innovation awareness and creative ability of enterprises, inject innovation vitality into the development of the hub economy, and promote Xi'an economy development of.

(4) Building a new highland of industrial science and technology cooperation. Technological innovation is the key to success. Xi'an should build a technological alliance from a macro level, increase technological investment, build a technological achievement transformation platform and technological resource coordination service system, enhance innovation driving force, promote technological transformation, promote industry quality and efficiency, and optimize and upgrade , Cultivate and develop new kinetic energy, and expand and strengthen Xi'an's high-end industries such as electronic information, new energy, aerospace, intelligent manufacturing equipment, and medicine. Adhere to the simultaneous development of independent research and development and open cooperation, accelerate the establishment of a modern information technology industry system, accelerate the formation of effective investment, create new consumption hotspots, promote product and technology upgrades, and promote high-end equipment to go abroad and participate in international market competition.

6 Conclusion

This paper discusses the driving factors of the development of Xi'an hub economic development. Through multiple regression analysis and collinearity test, the result shows that total trade volume, post and telecommunications business and passenger volume have passed the T-test, while freight volume, industrial enterprises number and investment amount have no significant impact. This shows that the agglomeration effect of Xi'an hub economy has not yet formed.

Our research points to several suggestions for the development of Xi'an hub economy. The first one is to increase the guidance and support of the government. The second one is to improve the business environment. The third one is to implement the talent strategy. A last one is to build a new highland of Industrial Science and technology cooperation.

While we focus our discussion on the driving factors of Xi'an hub economy, the research method and the suggestions we discuss apply not only to Xi'an but also to other inland hub city such as Zhengzhou, Wuhan, Chengdu. The results of the research are of interest to policy-makers and academics alike.

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