

# Research on the influential factors of China's logistics demand based on the econometric model

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*Received 28 October 2014, www.cmnt.lv*

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## Abstract

Logistics demand reflects the pace of economic development, and the pace of economic development also affects the change of logistics demand in turn. In fact, logistics demand is affected by many factors. Through the theoretical analysis, the paper points out that the influential factors on logistics demand mainly include four aspects, namely, economic development level, regional industrial structure, macro-economic policy and economic system, and consumption level and concept. Then, the econometric model is established with the data in different periods of time based on those four aspects to make an in-depth analysis of the application of the model. At the same time, in order to promote the development of the logistics industry, improve logistics demand and meet the development demand of the regional economy, it puts forward reasonable suggestions.

*Keywords:* logistics demand, econometric model, influential factors

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## 1 Introduction

With the continuous development of market economy and information economy, the logistics industry has grown from the end industry to the important one with a great impact on the economy and a role of guiding and promoting the development of other industries, and even the forerunner industry of other industries. Modern logistics industry is a comprehensive industry which integrates systematization, informatization and warehousing modernization together with IT information technology as the support and the transportation industry as the core. The development of the logistics industry plays a huge role in optimizing the industrial structure, enhancing the development of enterprises and improving the quality of economic operation. [1] In recent years, China's logistics industry has been growing rapidly. Various types of logistics enterprises have grown up and distribution center, logistics base, cargo loading center and other logistics related infrastructure facilities have been improved. Both the central and local governments attach great importance to the development of the logistics industry. The State Economic and Trade Commission, the State Planning Commission and the State Council Development Research Center all have made in-depth research and exploration on the problems and developed a series of necessary policies to promote the development of the logistics industry and create a good external environment for the application of logistics by enterprises and for the development of the logistics industry. [2] At present, some cities, especially those with rapid economic development like Shenzhen, Guangzhou and Beijing, provide support to the development of the logistics development from the level of the local government by developing a series of supporting policies.

Many cities have listed promoting the development of the logistics industry into the 10<sup>th</sup> Five-year Plan. Therefore, predictably, the logistics industry will become an important industry and a new economic growth point in China in the 21<sup>st</sup> century. The development and expansion of the logistics industry is of great significance to realizing the sustainable development of the Chinese economy, improving the quality of economic operation, optimizing the allocation of resources, and promoting the reform and development. [3] This paper makes an in-depth analysis on the influential factors on logistics demand with the empirical method and establishes the econometric model, which can provide the important method and reference for the governments and the enterprises related to the logistics industry to make logistics planning and analyze logistics demand. Thus, this research has important practical significance.

## 2 Analysis of the influential factors on logistics demand

Logistics demand refers to the demand for space, time and cost generated due to the distribution and circulation of some goods in the social and economic activities in a certain period of time. As an important part of the social and economic activities, logistics demand runs through the whole social and economic activities of production, circulation and consumption and has close relationship with the status and speed of the social and economic development. Thus, the status and speed of the social and economic development is the main factor affecting logistics demand. The factors affecting the status and speed of the social and economic development will inevitably affect the development of the logistics industry and logistics demand. Logistics demand can be reflected

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through the freight turnover rate and freight volume. Figure 1 presents the annual growth trend of China's logistics industry. According to the Figure, China's logistics quantity has been maintaining an average annual growth rate of 8% since 1986, lower than the growth rate of China's economy, which indicates the imbalance between supply and demand of logistics in China. Generally speaking, the growth rate of logistics is positively correlated with that of economy. At the same time, it can be known from the figure that the annual growth rates of freight volume and turnover are very unstable. The figures fell down very sharply particularly in recent years: the growth rate of freight volume was 14% in 2011, 11% in 2012 and still about 11% in 2013; the growth rate of freight turnover was 12% in 2011, 9% in 2012 and -3% in 2013. The change of logistics demand can reflect the development status of China's economy. Meanwhile, it's affected by many factors as follows:

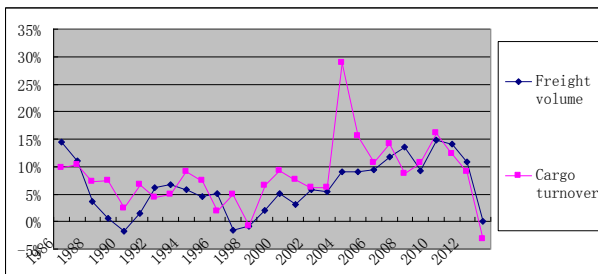


FIGURE 1 The changing trend of China's logistics demand  
Note: the data are from www.tjcn.org.com

The first is the level of economic development. The level of economic development determines the level of output and consumption, that is, the regional economic aggregate. In the short term, it's the determinant and basic drive of logistics demand. This is because the object of logistics is always the basic output and consumption of regional economy. If the regional output and consumption level is high, the economic aggregate is big and the logistics demand must be great. If the output and consumption level is low, the economic aggregate is small and the object of logistics will not be virtually high. [4,5]. Thus, the high economic development level leads to the high logistics demand. For example, after comparison between the central and west China and the east China, the relative per capita logistics demand in the central and west China is low and that in the east China is high.

The second is the industrial structure. Different industrial structures have a significant impact on the logistics demand function, logistics level and logistics demand structure. The logistics demand of agriculture, forestry and animal husbandry in the primary industry is extensive with large quantity but low value. Manufacturing and mining in the secondary industry provide the products with physical substance which are reliant on logistics from production and consumption, so they have great logistics demand. The tertiary industry is given priority to the service industry which is less dependent on the logistics activity but needs more the modern logistics service based on the information technology [6]. Thus, different industries have obviously different degrees of

logistics demand. In the regional industrial structure, if the primary and secondary industries occupy a large proportion, under given conditions, its logistics demand is large; but if the proportion of the tertiary industry is high, its logistics demand is small.

The third is the macro economic policy and management system. Due to the derivation of logistics demand, the macro economic policy directly affects the logistics quantity. First of all, if the policy can promote the economic development, the economic aggregate will increase, which will promote the development of the logistics industry and increase the logistics demand. If the macro economic policy fails to keep up with the development requirements of regional economy, leading to the economic stagnation or impossibility of recovery, it will affect the increase of the logistics demand [7]. Since the logistics service is strictly dependent on the infrastructure, the management system exerts a direct impact on the construction of the logistics infrastructure. For example, the increase of the investment in the logistics industry by the governments at all levels provides good conditions for the rapid development of the logistics industry. The investment scale in railways, highways and waterways directly affects the density and level of the transport network and further exerts the corresponding impact on logistics demand.

The fourth is the consumption level and concept. The ultimate purpose of circulation is consumption, so like the economic aggregate the consumption level can also reflect the regional logistics demand. If the regional consumption level increases, the demand for the products will be large. In other words, the local products cannot meet the consumption. Then, the products produced by other places will enter through logistics. The consumption concept will also affect the demand of products [8]. The circulation of different products needs different logistics demands. This is because the weight, volume and basic requirement for logistics which are important factors affecting logistics demand are different. In fact, the consumption concept directly affects the enterprises' management decision, production, sales and further the logistics size. New products and service always need the high-level logistics service for support.

The fifth is other factors. Market environment and technological advance also affect logistics demand. The logistics activity serves production and life. The change of the market environment affects the development speed of the regional economy, the residents' consumption expectations and thus the regional logistics quantity [9]. At the same time, different macro environmental conditions in different regions have different influence on the regional economy, which will also affect the flow direction and service way of logistics goods as well as the quality and quantity of service. The technological advance including the logistics technology will also affect the demand. For example, the Internet technology will increase the logistics demand. In fact, the domestic and foreign trading ways, economic globalization and other market environment all affect logistics demand.

3 Empirical analysis

3.1 MODEL ESTABLISHMENT AND PREDCTION

According to the theoretical analysis, the factors affecting the model include economic development level, regional industrial structure, macro economic policy and economic system, and consumption level and concept. The following indicators can be set: the added value of the primary industry (DY), the added value of the secondary industry (DE), the added value of the tertiary industry (DS) and the consumer level (XF). The development among industries can not only reflect the economic development level, but also the proportion change of the tertiary industry. At the same time, the logistics industry is also affected by its own development. Thus, the model can be established as follow:

$$WL = a_1 \cdot DY + a_2 \cdot DE + a_3 \cdot DS + a_4 \cdot XF + a_5 \cdot WL(-1) + u_t \tag{1}$$

The data are from China Statistical Yearbook from 1980 to 2013. To verify the model, it's necessary to test

$$\left. \begin{aligned} WL_{1980-2013} &= 205.9716 \cdot XF + 11.8296 \cdot DY + 9.5704 \cdot DS + 1.0517 \cdot DE + u_t \\ WL_{1980-1990} &= 520.4910 \cdot XF + 4.4747 \cdot DY + 8.6536 \cdot DS + 13.2296 \cdot DE + u_t \\ WL_{1990-2000} &= 201.7310 \cdot XF + 9.2186 \cdot DY + 2.0680 \cdot DS + 9.2289 \cdot DE + u_t \\ WL_{2000-2014} &= 273.3543 \cdot XF + 2.5861 \cdot DY + 2.2714 \cdot DS + 9.9887 \cdot DE + u_t \end{aligned} \right\} \tag{2}$$

TABLE 2 Technical Drawing of the Econometric Model

Time	XF	DY	DS	DE
1980-2013	205.9761	11.8296	9.5704	1.0517
1980-1990	520.4910	4.4747	8.6536	13.2296
1990-2000	201.7310	9.2186	2.0680	9.2289
2000-2014	273.3543	2.5861	2.2714	9.9887

3.2 THE PREDICTION RESULT

Figure 2 makes prediction with the data from 1980 to 2013. According to the figure, the difference between the budget line and the balance error line is small, which indicates that the prediction value is about 42 billion tons in 2014 according to the prediction. Figure 3 makes prediction with the data from 1980 to 1990. The prediction value is greatly different from the actual one, but the trends are consistent. The prediction value of the latter is greater than that of the former. Figure 4 makes prediction with the data from 1990 and 2000. It can be seen from the figure that the difference between the error and the actual value is the largest and the prediction value is small, which indicates that the data growth area during 1990 and 2000 is significantly different from that in other years and its growth rate is smaller than that of others. Figure 5 makes prediction with the data from 2000 to 2013. According to the figure, the prediction value is closer to the actual one and the difference between the balance error line and the prediction line is better than that of Figure 1, indicating that the model is more accurate.

the unit root. It's found through the ADF test that the sequence is in the unstable state under both no difference and the first order difference, but it's in the stable state after the second order difference. The specific results are shown in Table 1.

TABLE 1 Augmented dickey-fuller test statistic

Variable	t-Statistic	Prob.*	Variable	t-Statistic	Prob.*
DE	-8.6250	0.0000	XF	-4.6302	0.0134
DS	-8.1326	0.0017	1% level	-3.6702	
DY	-8.2647	0.0000	5% level	-2.9640	
WL	-3.2338	0.0285	10% level	-2.6210	

Thus, it can be seen that the model can be used for the correlation analysis. When WL(-1) is listed in the influential factors for analysis according to the expectation, the result is not significant, so it should be excluded. Here, the analysis is made from four directions. The sequence coefficients of the correlation analysis are shown in Table 2 and the model is as shown in Equation (2):

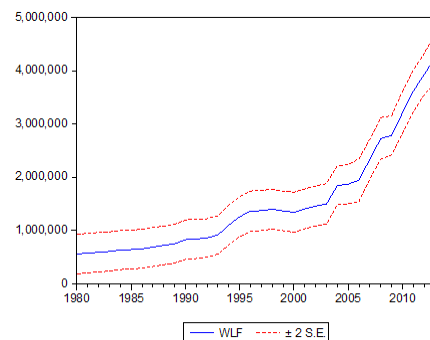


FIGURE 2 The prediction diagram based on the data from 1980 to 2013

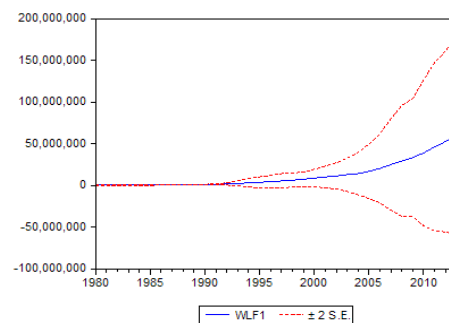


FIGURE 3 The prediction diagram based on the data from 1980 to 1990

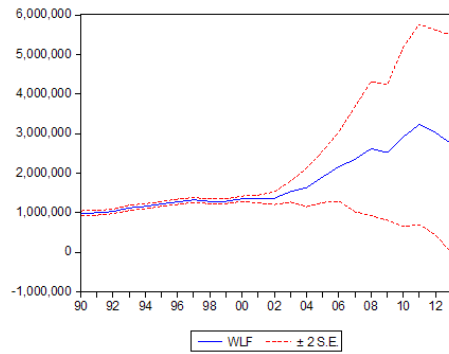


FIGURE 4 The prediction diagram based on the data from 1990 to 2000

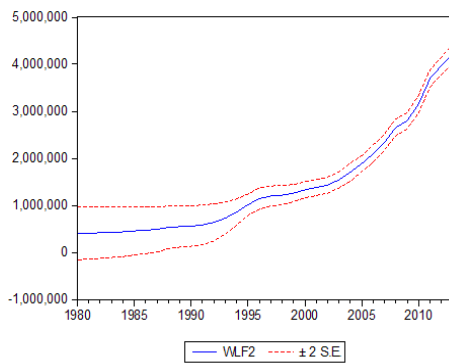


FIGURE 5 The prediction diagram based on the data from 2000 to 2013

### 3.3 APPLICATION ANALYSIS OF THE MODEL

First of all, the accuracy of the model can be verified through the model. The comparison among the parameters of four prediction models and four prediction diagrams indicates the accuracy of the model. It can be found that more cited data does not mean the more accurate model. The estimation should be based on the data in recent years. Thus, Figure 5 with the data in the past 13 years is more accurate than Figure 1 with the data in the past 34 years. This is mainly because the environment is always changing, so is the parameters of the model.

Secondly, the coefficients of the model change greatly, which indicates the great change of the model. Generally speaking, the greater the coefficient is, the greater the influence is. The great change of the coefficient is mainly because it's dependent on the environment. For example, the coefficient of the secondary industry changes greatly, indicating that its influence on logistics demand is small due to the development environments of different regional economies. When the trade volume of the regional goods is large, the demand for logistics will be huge; when the regions tend to satisfy the current scale of the industry, the trade volume is small and the demand for logistics will be small.

Thirdly, attention should be paid to the timeliness in the application of the model. In the current period, the model is affected by four influential factors. However, with the changes of the environment, the influential factors and the degree of influence, the model will also change, which is the timeliness of the model. To ensure

the long-term practical application of the model, it's necessary to update the influential factors according to the change of the environment, get rid of those with little influence or no influence and add some new ones. Thus, the empirical analysis should be made often to estimate the model with the data in the past dozen years to predict the future data.

### 4 Conclusion and suggestion

Analysis of the influential factors on logistics demand and prediction of the demand is to analyze the development of the logistics industry according to the changing trend of the influential factors and better satisfy the development requirements. This is because if the supply of the logistics industry can't meet the future development of logistics demand, it will limit the development of the regional industry and even the whole regional economy and affect the economic efficiency; if the supply exceeds the demand, it will waste the logistics resources and affect the economic efficiency, too. Therefore, in order to balance the relationship between the logistics demand and supply, ensure the moderate development of the logistics industry, meet the demand of economic development and promote the upgrading and transformation of the logistics industry at the same time, the following aspects should be improved.

The first is to cultivate the concept of modern logistics, grasp its development trend and develop the development plan of modern logistics based on the full consideration of regional development, economic structure, transportation information, city planning and logistics demand. The government should avoid the excessive interference in the logistics market and establish the socialized and specialized modern logistics system with the market as the orientation and the logistics enterprises as the main players.

The second is to integrate the logistics resources and cultivate the main players in the logistics market. In the large area of China, it should break the regional block, promote advantages and abolish disadvantages of each region. In addition, it should guide the manufacturing and trade enterprises to promote the recombination of enterprise logistics management and enterprise logistics orderly based on their own development requirements and establish the logistics model to meet their special requirements.

The third is to accelerate the construction of the informatized and standard logistics enterprises and comprehensively improve the logistics service and technical level. Informatization is the soul of modern logistics. Modern information technology realizes the information communication and sharing in different economic sectors and enterprises and thus achieves the purpose of effectively coordinating, managing and integrating the logistics elements and functions. It should promote the application of modern information management technology like ERP and MRP in logistics enterprises and logistics management of business enterprises, make great efforts to promote the construction of the public information platform, establish the sound e-commerce certification system, on-line payment system and logistics distribution management system, so as to create conditions for the smooth and efficient communication of logistics information.

## References

- [1] He G 2008 Forecast of regional logistics requirements and application of Grey Prediction Model *Journal of Beijing Jiaotong University(Social Sciences Edition)* **01** 33-7
- [2] Deleted by CMNT Editor
- [3] Hu H 2008 Research on the model of regional logistics demand forecast *Statistics and Decision* **17** 62-4
- [4] Luo Y, Liu G 2011 Study on the relationship between logistics service innovation and logistics demand -- Based on the Symbiosis Theory *Contemporary Finance & Economics* **02** 61-8
- [5] Wan L, Li Y, Wu J 2011 Application research on prediction of regional logistics demand *Microelectronics & Computer* **09** 160-4
- [6] Deleted by CMNT Editor
- [7] Huang M, Feng Y 2009 The Grey Prediction Model applies to regional logistics demand forecasting *Logistics Sci-Tech* **03** 17-20
- [8] Deleted by CMNT Editor
- [9] Liu Z, Li C, Chen B 2012 Regional Logistics Demand Forecast Based on Factor Analysis and Neural Network *Computer Simulation* **06** 359-62

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