The Law of International Trade Promotion Based on Growth Curve Algorithm

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Abstract. The law of international trade promotion based on growth curve algorithm is a new concept of the law of international trade promotion. The main purpose of this study is to find out how much the international trade promotion law has affected the promotion of natural resource poverty and developing countries, and whether it can be used as an effective tool for economic development. The study was conducted using data from different sources such as the World Bank Database and UNCTAD database. The research is based on the growth curve algorithm, which is a mathematical model used to analyze economic development. The main purpose of this algorithm is to predict the future development of economy. It can be used for forecasting and analysis in different fields, such as economics, finance, engineering and many other fields. It has been successfully applied in various applications, including stock market forecasting and financial planning. This method can also be used to predict future trends in the economy or business sector without collecting any data.

Keywords: Growth curve algorithm · International trade · Economic mathematical model

1 Introduction

International Economic and trade exchanges are not only the need for countries to complement each other's strengths and exchange needed goods, but also an important engine to promote world economic growth and human development and progress. Their resilience and vitality are a strong force to overcome various difficulties and challenges. Looking at the current situation of China's development, although it has achieved initial results in terms of economic level, it still lacks corresponding systems and measures. Compared with other developed countries in the world, there is still a certain gap, and the improvement of economic level needs to be further strengthened [1]. Therefore, the development of international economy and trade can effectively strengthen the external trade, cooperation and exchanges between China and other countries. China can learn from each other's strengths in the process of foreign trade, learn from foreign excellent economic systems, and constantly formulate forward-looking strategies in combination with the development form of the times, optimize China's economic system, improve China's economic model, and promote the diversified development of

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China's economic model, So as to realize the double promotion of China's economic level and comprehensive national strength.

Close international trade relations are the primary driving force to promote benign competition among enterprises. The cooperation between overseas enterprises and local enterprises can effectively strengthen the exchange and learning of both sides, help employees' work enthusiasm and innovation spirit to effectively improve, stimulate the competitive potential of enterprises, promote enterprises to deeply explore the development direction and objectives, and help enterprises' sustainable development.

Secondly, the improvement of the economic benefits of enterprises is closely related to the improvement of the national economic level. The international trade under the background of globalization has increased the number of competitive objects of enterprises, which has brought some fresh blood and put some pressure on enterprises. In order to gain a foothold in the highly competitive market, enterprises should constantly examine themselves, follow the law of market development and the needs of the audience, and improve the service quality and production and operation quality, In order to improve their comprehensive competitiveness and occupy a certain advantage in the fierce market competition [2].

Economic globalization has promoted the efficient development of international trade, which has given it a new development direction and development goal. China should clearly understand the current international trade development situation, face many challenges in the process of foreign trade with an objective attitude, deeply grasp the market development law, look for breakthroughs and development opportunities, and then optimize the form of China's foreign trade with corresponding policies to improve the quality and ability of China's international trade, Achieve sustainable economic development. Based on this, this paper studies the law of international trade promotion based on the growth curve algorithm.

2 Related Work

2.1 Growth Curve Algorithm

Growth curve in transcriptome analysis, principal component analysis (PCA) is often a very important means to reflect the results. Principal component analysis is a commonly used dimensionality reduction algorithm in data mining. It was proposed by Pearson in 1901 and later developed by hotellingr in 1933. Its main purpose is "dimensionality reduction". By extracting the largest individual differences shown by principal components, it can also be used to reduce the number of variables in regression analysis and cluster analysis, which is similar to factor analysis. (to tell the truth, I didn't quite understand it).

Take a small example: for example, if you want to do an analysis on the factors of obesity, then you design 50 indicators that you think are very important. However, these 50 indicators are too complicated for your analysis [3]. At this time, you can use the method of principal component analysis to reduce the dimension. There will be one kind of connection and influence among the 50 indicators. After the principal component analysis, three or five principal component indicators are obtained. At this time, these

principal component indicators cover most of your 50 indicators, which simplifies your analysis (from 50 dimensions to 3 and 5 dimensions).

If it is applied to the analysis of biological information, it can be understood as follows: we have obtained an expression profile data, which contains a lot of differentially expressed gene information. (generally, the number of these genes is very large, thousands). So it's definitely not possible to analyze so many genes. So we need to find the most representative to distinguish.

There are SVD Analysis Methods (singular value analysis method: the main application of SVD is to compress the data, and only the most important data is retained.), NIPALS analysis method (partial least squares PS regression), probabilistic PCA ppca: (that is, it is considered that the observed high-dimensional variables are actually generated by low-dimensional latent variables through a generalized linear model (this low-dimensional to high-dimensional mapping can be analogous to the curve equation in three-dimensional space, and the one-dimensional independent variable is mapped to the three-dimensional function value YY) [4]. Our purpose is to infer the underlying latent variables (low-dimensional) through the observed values (high-dimensional), In this way, the effect of data compression is realized).

This paper takes the volume of foreign trade goods in international logistics as the primary index to measure China's international logistics, and takes the growth curve function as the calculation model. Growth curve function model is also called logistic function model, which is widely used in modern commerce, production industry, biological science and so on.

2.2 Promotion Effect of International Trade

Thinking from a new angle of modern economic theory. According to zhouzhenhua, a domestic scholar. Opening up on the basis of structural benefits can improve the domestic industrial structure through international industrial linkages. This structural improvement is manifested in two aspects: first, to eliminate structural bottlenecks and promote structural rationalization; Second, strengthen the ability of structural transformation and promote the upgrading of structure. This requires that there must be selectivity in opening to the outside world, and the degree of trade openness should be determined according to the requirements of its structural optimization. At the same time, the state should make necessary intervention in import and export trade, and implement limited protection and support for the development of emerging industries on the premise of conforming to international norms. This is an open strategy for developing countries to actively participate in the international division of labor and make use of international industrial linkages to achieve leapfrog development. 2. The form of international trade promoting the growth of domestic industrial structure international trade promotes the growth of domestic industrial structure through the mechanism of comparative interests, which varies according to the national conditions of each country and the different development stages of each country's economy [5]. It can be roughly divided into two types: - it starts with the import of a certain product and uses this imported product to open up the domestic market and trigger the development of the industry in China. When the industry has developed to a certain extent, economies of scale have been fully utilized, and production costs have decreased significantly, the product can be exported by taking

advantage of the comparative advantages of some domestic factors of production, and the development of the industry can be further promoted through the development of the international market. In the practice of foreign trade in China, the "import and export" should belong to this type. Import and export refers to the use of foreign raw materials and technologies to process and produce finished products for re export [6]. There is potential in domestic production and good sales abroad. However, carrying out the business of "import and export" under the condition of shortage of raw materials and parts can give full play to the advantage of rich labor force, tap the potential of equipment and technology, expand the production of export commodities, and form a labor-intensive factor combination.

3 Research on the Law of International Trade Promotion Based on Growth Curve Algorithm

This paper expounds the impact of international trade on the growth of a country's industrial structure, focusing on analyzing the dynamic effect of other countries' industrial structure changes through international industrial linkages to change their own industrial structure, so as to promote economic growth. Different from the general analysis of the relationship between economic growth and trade changes, this analysis must go through the intermediary link of perfecting the domestic industrial structure [7]. The theoretical assumption implied here is that international trade may bring short-term economic growth without improving the domestic industrial structure or even leading to the deterioration of the domestic industrial structure. This growth is at the cost of a large number of inefficient use of domestic resources, and will eventually hinder economic growth. Its growth curve model:

$$O_{v,j} = h\left(\sum_{i=1}^{f_{k-1}} \sum_{u \in N[v]} w_{i,j,u,v} x_{u,i}\right), (j = 1, ..., f_k) \tag{1}$$

The impact of China's international logistics on China's trade shows a typical growth curve: (1) in the early stage of China's international logistics development, the total logistics volume and foreign trade cargo transportation volume (x) are small, and the role in promoting China's trade is not obvious; (2) With the continuous accumulation, the overall scale of China's international logistics continues to expand Its strength has been strengthened, and its role in promoting China's international trade has become more and more obvious. At this time, it shows a rapid rising curve; (3) When the overall scale of China's international logistics reaches a certain level, its contribution to China's international trade reaches a saturation value, which is difficult to rise again and stays within a relatively stable range near the maximum value [8]. It can be seen that the growth curve function has a high similarity with the influence curve of China's cargo transportation volume on China's international trade amount. Therefore, it is feasible to use the growth curve function model to analyze the role of China's international logistics in promoting China's trade. Figure 1 below shows the trend of growth curve driven by international trade.

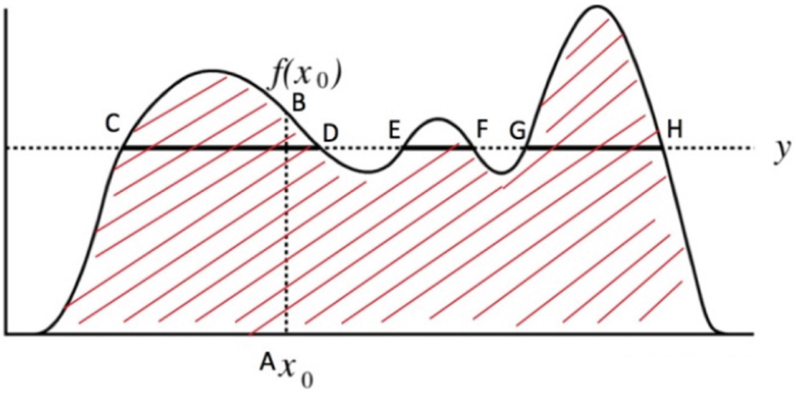

Fig. 1. Growth curve driven by international trade

The basic idea of one-dimensional slice sampling of the impact of international logistics on China's trade is: first, two-dimensional sampling (Z, g) is carried out from the shadow area between the probability curve f (a) and y = o, and then the point is projected onto the x-axis (that is, y is directly removed). The correctness of this method is actually very easy to understand, but the problem is, how to sample from this area?

Because it is two-dimensional sampling, a natural idea is to use Gibbs sampling to extract P (azlg) and P (g/z) respectively. How can these two probability distributions be determined for the impact of international logistics on China's trade? In fact, there are many ways to select P (Z g) and P (gaz) that can be guaranteed to be sampled from the shaded area. However, the most intuitive way is to define P (XLY) as the uniform distribution on the horizontal line and P (YX) as the uniform distribution on the vertical line. Given the initial point O, the specific steps are as follows [9]:

1. determine the vertical line (0, f (AO)) of O, and uniformly sample from this line segment (AB in the figure).
2. Find the horizontal line contained in the shaded part, that is, the line segments CD, EF and GH, and conduct uniform sampling from these three line segments to obtain the next sample 1.
3. repeat the above two steps.

It seems that the whole algorithm of international logistics to China's trade has been completed. The vertical line is easy to find because it is internally continuous; Horizontal lines are composed of many different line segments. How can we find them! The difficulty of this algorithm is also here. In fact, there is a feeling similar to the "random walk behavior" in the MH algorithm mentioned earlier, that is, how to make the algorithm explore the distant landscape (line segment). However, slice sampling can be regarded as a special case of MH algorithm [10]. Like HMC, it is just a bit of a miracle of transition kernel.

4 Conclusion

The research on the law of international trade promotion based on the growth curve algorithm is a research aimed at predicting the future development trend of international trade promotion. The main purpose of this study is to develop and use a new forecasting method, which can be used as an effective tool to promote foreign trade. The research was conducted by experts from many fields, such as economics, statistics, finance, law and sociology. It also includes some research related to this topic, such as forecasting market demand, forecasting commodity price changes, etc. Determine whether the export volume increases or decreases by comparing with the import volume. It also determines whether exports increase or decrease compared to imports. The analysis can be completed by using statistical data obtained from different sources such as customs statistics, foreign exchange rate data, etc. This type of research has been used by economists and statisticians around the world for many years because it provides very accurate results on how much income will be generated by exporting goods and services. The purpose of this study is to analyze the current situation and trend of promoting international trade.

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