

International Competitiveness of

China's High-tech Products

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Abstract: In recent years, the promotion of high-tech products development aroused the fast growth of our country economy. This is related to China has always paid attention to the development of science and technology and the cultivation of talents. The occurrence of trade disputes between China and the United States has changed the international trade, to a certain extent. As an important factor affecting China's economic development, high-tech products needs a more comprehensive objective concept in the evaluation process. The essay explore the international competitiveness of high-tech products based on the revealed comparative advantage index, from two angles, one of which is normalized trade balance (NTB) and the other is commodity structure convertible rate. Porter Diamond Model is used to analyze the the main cause of low competitiveness and find a solution. It aims to enhance the international competitiveness of China's high-tech products.

1. Introduction

For now, The evaluation methods of the industrial international competitiveness, including the absolute advantage theory, relative advantage theory and factor-endowment theory. The analysis of national industry is mainly through Porter Diamond Model and comparative advantage theory. There are some differences between high-tech products and other industries, for example, the high demand for talents, high requirements for product quality, more investment in product production and longer time consumption. Although there are many difficulties in the development of high-tech products, it is still a national emphasis project due to high profit and uniqueness can occupy a strong competitive position in the market competition.

2. Overview of High-Tech Products in China

2.1 The Import and Export Volume of High-Tech Products Increased Rapidly

Figures showed that the gap between between China's imported high-tech products and exported high-tech products increases over time. The trade volume of China's exports has continuous increased. In 2017, the trade volume of China's exports and imports increased. The difference between imports and exports in 2017 is lower than 2015. Because trade volume of China's import and export increased in 2017, The international market share of China's High-tech Products is very impressive. As shown in Figure 1, China's import and export quota of high-tech products from 2015 to 2019 was positive,

reflected the good situation of China's import and export trade from 2015 to 2019. By observing the import and export trade quota from 2018 to 2019, we can find that The year-on-year growth in 2018 was about 12%, and the growth rate in 2019 was 2.2% lower than that in 2018. And also showed that there are problems in the development of high-tech products in 2019.

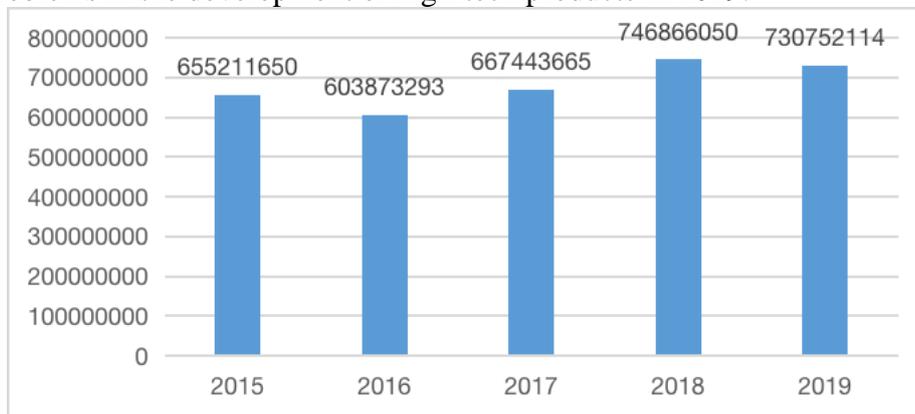


Fig.1 The Amount of China's Exported High-Tech Products in 2015-2019.

2.2 The Import and Export Structure of High-Tech Products is Concentrated.

The nine technical fields of my country's import and export of high-tech products are: aerospace technology, biotechnology, computer integrated manufacturing technology, computer and communication technology, electronic technology, life science technology, material technology, optoelectronic technology and other technologies. According to relevant statistics, in 2019, China's exports were mainly concentrated in a few of these areas, mostly related to computer and communication products. The number of exports of these products accounted for more than 90% of the total export volume, which is sufficient to illustrate the import and export of high-tech products in my country. The problem of structural imbalance, the polarization is serious, the structure is too concentrated, and further improvement and adjustment are needed.

By summarizing relevant reports of this year, the export volume of China's high-tech products increased by 4.7% year-on-year, and the import volume increased by 4% year-on-year in 2019. In addition, the export growth rate of electronic technology was highest, with a year-on-year growth of 34.7%, and the import growth was second with a year-on-year growth rate of 17.4%. The development of other industries had varying degrees of surplus, which reflected that China's high-tech industry was single. So once there are risks in this industry, the development of high-tech industry will be seriously affected.

3. Empirical Analysis of International Competitiveness Evaluation

3.1 Trade Competitiveness Index

The TC index is a widely adopted method to calculate the imports and exports balance. The TC index is between - 1 and 1, if the index is 0, it is expressed as the average level. If the index is closer to 1, the competitiveness is stronger, and vice versa.

According to relevant survey statistics, since 2010, as of the end of 2019, the Trade Competitiveness Index (TC Index) of goods, manufactured goods and high-tech products in China has been positive, which is to a certain extent it reflects the strong international competitiveness of the three, and it can also show that my country has an obvious form of processing and re-exporting through foreign imports.

The TC index of China's high-tech products was 0.088 in 2010 and 0.068 in 2009, which was gradually declined. Although the index recovered in 2016, the growth rate was small. Although the TC index of my country's high-tech products fluctuates, it fluctuates between 0.068 and 0.088. On the one hand, it shows that there is room for substantial improvement. On the other hand, it shows that the development of high-tech industries is not mature enough and the competitiveness is slightly low. Besides, the TCP index of industrial manufactured goods has been maintained above 0.210, which means that China's manufactured goods had strong international competitiveness.

The TC index of China's high-tech products was 0.088 in 2010 and 0.068 in 2019, showing a gradual downward trend. Although the index rebounded in 2016, the growth rate was relatively small. Although the TC index of my country's high-tech products fluctuates, it fluctuates between 0.068 and 0.088, it shows that there is room for substantial improvement. On the other hand, it shows that the development of high-tech industries is not mature enough and the competitiveness is slightly low. The TC index of manufactured industrial products continues to remain above 0.210, which represents that China's manufactured industrial products have strong international competitiveness.

By comparing the TC index of high-tech products and industrial products, it can be found that the international competitiveness of China's industrial products is stronger than high-tech products. The PC index of high-tech products was slightly higher than that of goods, which shows that the international competitiveness of high-tech products is higher than that of goods. China's cargo TC index fluctuates greatly. In 2010, the TC index was 0.125. From 2011 to 2016, the TC index was less than 0.1, and it was in the form of a broken line. It continued to decline before 2014 and began to rebound in 2014. By 2016, the TC index reached 0.78. Then in 2017, China's cargo industry developed rapidly. The TC index reached the highest peak of 0.149 in recent years, and then declined in the following two years. Compared with goods, high-tech products have relatively stable development, and their international competitiveness has been slightly lower in recent years.

3.2 Revealed Comparative Advantage Index

The RCA index is a widely adopted method to calculate the proportion of China's exports of products to the total exports of similar products in the world. The RCA index ranges from 0.8 to 2.5. When the index value is less than 0.8, it indicates that the competitiveness of the product is low in the world. And when the index is between 1.25 and 2.5, the competitiveness is relatively strong. Besides, when RCA index is greater than 2.5, it shows that the product has strong international competitiveness. We evaluate the international competitiveness of pharmaceutical manufacturing, aerospace manufacturing, electronic communication equipment manufacturing and medical equipment and instrumentation manufacturing industry between the United States and China by RCA index.

As shown in Table 1, the RCA index of China's electronic communication equipment manufacturing industry was more than 2.84 from 2010 to 2019, which reflected that the international competitiveness of China's electronic communication equipment manufacturing industry was strong. The index of the United States was 0.98, which showed that the international competitiveness was weak. The RCA index of the medical manufacturing industry in China was generally lower than that in the U.S., which showed that the competition of medical manufacturing industry in the U.S. is more higher than that in China. The lowest level of international competitiveness of the medical manufacturing industry in the U.S. from 2010 to 2019 was 1.18, which showed a stable development state. Although China's international competitiveness of aerospace manufacture was gradually improving, there was still a large space for development compared with the United States. In addition, the international competitiveness of medical

equipment and instrument manufacturing industry of the U.S. was obviously higher than that of China. China's RCA index of revealed comparative advantage was about 0.6, while the lowest index in the United States was 2.51. There was a huge gap between the international competitiveness of China's medical equipment and instrument pharmaceutical manufacturing industry and the United States.

Table 1 the Revealed Comparative Advantage Index (Rca) of China and U.s. from 2010 to 2019

Time	Pharmaceutical manufacturing industry		Aerospace Manufacturing Industry		Electronic communication equipment manufacturing industry		Medical equipment and instrument manufacturing industry	
	China	America	China	America	China	America	China	America
2010	0.78	1.8	0.6	1.45	2.83	0.84	0.62	2.91
2011	0.71	1.93	0.53	1.22	2.86	0.83	0.6	2.85
2012	0.73	1.78	0.75	1.23	2.99	0.98	0.6	2.88
2013	0.66	1.45	0.87	1.38	3.15	0.84	0.62	2.91
2014	0.57	1.29	1.19	1.34	3.15	0.98	0.62	2.87
2015	0.53	1.18	0.89	1.3	2.85	0.95	0.62	2.78
2016	0.51	1.45	0.87	1.29	2.84	0.93	0.6	2.65
2017	0.47	1.51	1.31	1.53	2.88	0.87	0.6	2.57
2018	0.39	1.62	0.88	1.41	2.94	0.86	0.6	2.53
2019	0.51	1.4	0.86	1.32	2.86	0.97	0.63	2.51

3.3 Conversion Rate of Commodity Structure

The conversion rate of commodity structure is obtained by calculating the proportion of product exports and industrial manufactured goods exports. The production of high-tech products can greatly increase the value of original materials. Relevant data showed that China's commodity structure conversion rate was about 30%, which showed that the transformation ability of China's high-tech products was low. We should improve the technology application mode and change the original export structure to improve the conversion rate of product structure.

Compared with foreign, the development of China's high-tech products is relatively short in time. But due to the strong development speed and the single field of electronic communication, the international competitiveness of high-tech products in China is low.

4. The Reasons for the Low International Competitiveness of China's High-Tech Products.

This chapter analyzes the reasons for the low international competitiveness of China's high-tech products through the Diamond Model, mainly from six aspects such as the resource elements, demand conditions, auxiliary industries, enterprise strategy and government.

4.1 Resource Elements

We can analyze the reasons for the low international competitiveness of China's high-tech products from two aspects: primary factors and advanced elements. First of all, China's primary factor is relatively abundant compared with the United States, while the United States is relatively rich in high-level elements. The primary factor has more original advantages, and high-level elements can greatly improve the level of national economic development. China's awareness of intellectual property protection is weaker than America, and the awareness of innovation is

relatively lower than America. In addition, the ability of financial risk control of the United States is higher than that of China.

4.2 Demand Conditions

Through the study of international competition, Porter found that the internal demand of a country affects the international competitiveness of a country to a certain extent. When the demand for products is strong, the production desire of enterprises will be greatly promoted. And we can achieve the purpose of increasing profits by improving the quality of products and innovation ability.

4.3 Auxiliary Industries

Achieving economies of scale can greatly increase production efficiency among enterprises and improve international competitiveness. The development of high-tech industry needs the progress of many other industries. As a country with a large population, China's production capacity is relatively strong, but the innovation ability is relatively weak.

4.4 Enterprise Strategy

Enterprises always participate in international trade directly and compete with other countries, whose strategy plays a guiding role. The number of small and medium-sized enterprises in China accounts for 99%. Most of the small and medium-sized enterprises are at a low level for long-term development strategy formulation. In addition to the fierce market competition environment, the difficulties faced by small and medium-sized enterprises are becoming more and more difficult.

4.5 Government

Compared with foreign countries, the development of domestic high-tech industry is not long enough, and the development of China can not catch up with developed countries in a short time. In order to improve the research and development and innovation ability of high-tech products, China has established a high-tech industrial park, which provides a variety of preferential policies for high-quality enterprises and provides favorable conditions for the breakthrough of China's technical barriers. Besides, the United States has invested more resources into enterprises with higher market share, which has achieved the purpose of improving international competitiveness in a short period of time. However, the transformation level of technological achievements in China is relatively weak, and the promotion space is relatively large.

4.6 Opportunities

The application scope of artificial intelligence has been gradually increased in developed countries, but China is still based on practical application. The gap in innovation technology and thinking between China and developed countries can not be ignored. Therefore, China can learn from the international cash concept, strive to innovate, and create a favorable environment for the development of high-tech products.

5. Policy Suggestion

5.1 Correctly Treat the Primary Elements and Accelerate the Development of Advanced Elements.

The awareness of the research and the innovation is important to promote the development of high-tech industry. Our country should not only pay attention to the cultivation of domestic talents, but also need to introduce modern equipment and talents. Besides, we need to make full use of the primary elements, and transform them into advanced elements to promote the efficient transformation of scientific research achievements.

5.2 Continuously Improve Domestic Demand and Promote Supply Innovation

We need cultivate the awareness of demand for quality, environmental protection and other aspects, and force relevant enterprises to carry out product technology innovation. In addition, we should strive to make the supply becomes more popular and constantly improve the technical content of products to increase exports.

5.3 Improve the Overall Level of Related Industries

The realization of scale effect can greatly increase the production efficiency among enterprises and enhance the international competitiveness. The distribution of most small and medium-sized enterprises in China is relatively scattered, and they need to pay out many times to complete production in the production process. Therefore, enterprises should pay attention to production and research, establish a long-term cooperation mechanism through effective communication, and constantly improve their research and innovation capabilities on the basis of understanding the real market demand.

5.4 Build a Number of Multinational Enterprises

Due to the openness of the market economy, it can be supported by mergers and expansion of enterprises, and cultivate a group of high-level multinational enterprises. Such enterprises should pay more attention to the construction of a modern enterprise system, be precise and detailed, maintain quality and quantity, give play to the “craftsman spirit”, and enhance competitiveness.

5.5 Play to the Role of the Government

The government should use the export tax rebate policy flexibly to give full play to the positive effect on high-tech industries. Establish and improve the promotion system, the government will play its macro-control functions, base itself on the international situation, and establish a set of technical regulations and related standards system that not only meets international standards, but also suits my country's national conditions, and points out the direction for the development of high-tech industries.

5.6 Grasp Opportunity

Seize the new development opportunity of industrial intelligence, rely on the advantages of China's intelligent field established over the years. And Accelerate the integration with the industrial manufacturing industry, expand the proportion of industrial robots in the manufacturing industry, and reasonably reduce costs. Promote the intelligent process of high-tech industry, further reduce human costs, resource costs, etc., so as to reduce the cost of enterprises and increase the income space and get further development.

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