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The Agricultural Export Competitiveness and Independent Innovation in Liaoning Province

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Abstract Through the vertical and horizontal analysis of agricultural export data in Liaoning Province during the period 2006–2010, we can find that Liaoning Province has already a major exporter of agricultural products, but there is no significant increase in many indicators with great fluctuation or declining trend. Meanwhile, compared with other provinces, the competitive advantages of agricultural export in Liaoning Province are not obvious, lacking competitive potential. Analysis shows that it is a strenuous task for Liaoning Province to transform from a major exporter of agricultural products to strong export province; during the course, relying on independent innovation is the fundamental guarantee. Liaoning Province should rely on independent innovation, to create new agricultural varieties, lead the international standards of agricultural products, form the brand agriculture, and improve the agricultural industry chain.

Key words Export competitiveness, Comparative analysis, Independent innovation

1 Introduction

Since the reform and opening, the agriculture in Liaoning Province has entered a new period of rapid development by virtue of its geographical advantages, resources and economic base. Liaoning not only becomes one of the China's major grain-producing provinces, but also reaches the national advanced level in the total production and development of vegetables, fruits, livestock, aquatic products and other aspects. In particular, the implementation of development and opening-up strategy of the Liaoning coastal economic zone, Shenyang economic zone strategy, and Northwest Liaoning breakthrough strategy, has promoted the industry agglomeration and construction of major projects, and enhanced the further development of superior specialty agriculture and facility agriculture in Liaoning Province. Liaoning agriculture has ushered in another development opportunity.

Along with the development of agriculture in Liaoning, the agricultural exports in Liaoning Province continue to increase. During the period 2006–2010, the agricultural exports in Liaoning Province were ranked among the top five for five consecutive years in China. In the first quarter of 2011, the agricultural exports in Liaoning Province reached \$ 1.013 billion, an increase of 28.93%, higher than the overall export growth rate in Liaoning, which broke the "short board" situation of agricultural export in Liaoning Province. Agricultural products become the main products driving the export growth of Liaoning Province.

It can be said that Liaoning Province has become a veritable major agricultural exporter. However, "large exporting province"

is not equal to "strong exporting province". In this regard, there are two issues we need to think about. How is the agricultural export competitiveness in Liaoning Province accompanied by the expansion of export scale? What factors can support the agricultural export competitiveness in Liaoning Province?

Export competitiveness can be affected by many factors, and only when the export competitiveness is supported by scientific and technological capabilities can the sustainable development of export is ensured. Based on a country's economic development in different stages with different competitiveness, Michael Porter (1990) believed that the national competitiveness is from factor-driven phase, investment-driven phase, innovation-driven phase, and wealth-driven phase^[1]. Nowadays, with the decreased advantage of resources and investments in China, there is an urgent need to be driven by innovation. And so is the agricultural sector. Through the vertical and horizontal analysis of agricultural export data in Liaoning Province during the period 2006–2010, this paper from the perspective of independent innovation explores the effective ways to enhance the competitiveness of agricultural exports in Liaoning Province.

2 Comparative analysis of agricultural export competitiveness in Liaoning Province

2.1 Vertical comparison of agricultural export competitiveness in Liaoning Province The agricultural export in Liaoning Province experienced the process of starting, from less to more, and rapid development. Table 1 shows the some basic conditions on the agricultural export in Liaoning Province from 2006 to 2010.

According to Table 1, the agricultural export in Liaoning Province in recent years is analyzed as follows:

(i) Exports and export growth conditions. From Table 1, we can find that except in 2009 affected by the financial crisis, the scale of agricultural export in Liaoning Province in other years was

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constantly expanded, increasing from \$ 2.4 billion in 2006 to nearly \$ 3.6 billion in 2010; in most years, the agricultural export in Liaoning Province increased more than in the previous year, and the growth rate reached 27.4% in 2007, but the fluctuation is large.

Table 1 The basic conditions about agricultural export in Liaoning Province (2006 – 2010) Unit: \$ 10⁴

Year	Export value	Year-on-year growth rate// %	The share of agricultural exports in total exports in Liaoning// %	The share of exports in national agricultural exports// %
2006	241 343.8	11.5	8.5	7.8
2007	307 521.4	27.4	8.7	8.4
2008	335 226.0	9.0	8	8.3
2009	306 806.3	-8.5	9.2	7.8
2010	359 030.5	17.0	8.3	7.3

Data source: The data on "export value and year-on-year growth rate" in the table are from Monthly Statistical Report of Chinese Agricultural Imports and Exports by the Foreign Trade Division of the Ministry of Commerce; the data on the share of agricultural exports in total exports in Liaoning and the share of exports in national agricultural exports are calculated and sorted based on Monthly Statistical Report of Chinese Agricultural Imports and Exports by the Foreign Trade Division of the Ministry of Commerce, and Liaoning Provincial Economic and Social Development Statistical Communique.

(ii) The share of agricultural exports in total exports in Liaoning and the share of exports in national agricultural exports. Table 1 shows that over the past five years, the share of agricultural exports in total exports in Liaoning was basically in 8% – 9%, and the share of exports in national agricultural exports was basically in 7% – 8%. Both have a common characteristic: no significant increase, having a downward trend.

(iii) Trade Competitiveness Index. Trade Competitiveness Index (TC) is the ratio of net export value of a product in a country or region to the total import and export value of this product, often used as an important measure. The formula is as follows:

$$TC = (X_{ij} - M_{ij}) / (X_{ij} + M_{ij})$$

where X_{ij} is the export of product j in country i or region i ; M_{ij} is the import of product j in country i or region i ; $X_{ij} - M_{ij}$ is the net export of product j in country i or region i ; $X_{ij} + M_{ij}$ is the total import and export of product j in country i or region i .

The value of TC index is in $(-1, 1)$. If TC index is greater than 0, it indicates that such goods have strong international competitiveness, and the closer to 1, the stronger the competitiveness; if TC index is smaller than 0, it indicates that such goods have no international competitiveness; if TC index is equal to 0, it indicates that the international competitiveness of such goods is close to the international level^[2].

From the agricultural export in Liaoning Province, based on the data from Monthly Statistical Report of Chinese Agricultural Imports and Exports by the Foreign Trade Division of the Ministry of Commerce, during the period 2006 – 2010, TC index of agricultural products in Liaoning Province was 0.29, 0.31, 0.26, 0.20 and 0.09, respectively. Obviously, the agricultural export competitiveness in Liaoning Province only has weak competitive advantage in most years, and it tends to decrease. In addition, from the composition of agricultural products for export, there are great differences in the export competitiveness between different agricultural products. In 2009 and 2010, the export of seafood and edible vegetable oil in Liaoning Province had certain competitive advantage, but the food export had great competitive disadvantage.

2.2 Horizontal comparison of agricultural export competitiveness in Liaoning Province In order to well analyze the agricultural export competitiveness in Liaoning Province, we should not only carry out longitudinal analysis of it, but also place it within the country to conduct horizontal comparison with the other provinces. Table 2 lists the basic conditions of the agricultural export in Liaoning Province and China's major agricultural exporting areas during the period 2006 – 2010.

Table 2 The agricultural exports in Liaoning Province and other main areas (2006 – 2010) Unit: \$ 10⁴

Region	2006		2007		2008		2009		2010	
	Export value	Year-on-year growth rate// %	Export value	Year-on-year growth rate// %	Export value	Year-on-year growth rate// %	Export value	Year-on-year growth rate// %	Export value	Year-on-year growth rate// %
Shandong	809 142.8	17.3	924 663.9	14.3	997 651.4	7.9	976 554.9	-2.1	1 270 540.4	30.1
Guangdong	384 949.6	7.7	414 269.4	7.6	462 752.5	11.7	488 335.5	5.5	567 171.2	16.1
Fujian	241 048.2	22.9	274 771.2	14.0	303 406.1	10.4	342 250.6	12.8	495 820.3	44.9
Zhejiang	268 550.5	9.6	292 953.5	9.1	335 216.6	14.4	300 604	-10.3	366 675.3	22.0
Liaoning	241 343.8	11.5	307 521.4	27.4	335 226.0	9.0	306 806.3	-8.5	359 030.5	17.0
Jiangsu	138 172.8	32.6	163 851.9	18.6	197 800.7	20.7	196 756.2	-0.5	252 184.6	28.2
Shanghai	105 729.5	18.8	126 064.9	19.2	130 340.1	3.4	121 076.2	-7.1	148 928.6	23.0
Yunnan	55 352.8	14.5	66 496.4	20.1	80 076.8	20.4	97 372.1	21.6	130 733.7	34.3
Hebei	83 969.3	7.7	93 865.7	11.8	100 066.2	6.6	101 769.0	1.7	122 954.7	20.8
Beijing	128 412.9	9.6	202 255.6	57.5	131 781.6	-34.8	106 389.8	-19.3	105 645.7	-0.7

Data source: The data based on Monthly Statistical Report of Chinese Agricultural Imports and Exports by the Foreign Trade Division of the Ministry of Commerce.

From the basic information in the table, we can find that the agricultural exports in Liaoning Province are among the top five, indicating its status of a major exporter and certain export competi-

tiveness. But the export scale and ranking of export scale do not experience significant changes. In terms of the export scale, there is a wide gap between Liaoning and Shandong or other major ex-

porters; in terms of the potential of trade, there is no obvious difference between Liaoning and Yunnan or other provinces whose export scale grows rapidly.

In terms of situation in Liaoning and Shandong, it can be found from Table 2 that in terms of agricultural export scale and the share of exports in national agricultural exports, there is a large gap between Liaoning and Shandong. In Jiangsu, Zhejiang, Yunnan and other provinces, the exports grows rapidly, and the potential of trade increasingly looms large. As can be seen from Table 2, compared with Yunnan, the export growth rate of Yunnan exceeded that of Liaoning in most years.

3 Conclusions and recommendations

3.1 Conclusions Based on the above analysis, we can draw the following basic conclusions:

(i) Liaoning Province has been a major exporter of agricultural products, but some indicators have not yet been enhanced significantly, such as agricultural exports, export growth rate, the share of agricultural export in total export in Liaoning Province, and the share of its agricultural export in national agricultural export; some indicators show a downward or fluctuation trend.

(ii) Although the export scale in Liaoning Province has been expanding, the international market share is low, and the trade competitiveness only has weak advantage, and tends to decrease.

(iii) Compared with other provinces, the competitive advantage of agricultural export in Liaoning Province is not obvious, and the competitive potential is short.

(iv) There are many reasons for the fall of export competitiveness, and the lack of independent innovation capability is an important constraint. Relying on independent innovation to enhance the competitive advantage will be a fundamental way to improve the agricultural export competitiveness in Liaoning Province.

3.2 Recommendations It is necessary to use independent innovation to improve the agricultural export competitiveness in Liaoning Province. Independent innovation is the key for Liaoning Province to transform from large agricultural exporter to strong agricultural exporter, and an important way to improve the agricultural export competitiveness in Liaoning Province.

3.2.1 Using independent innovation to create new agricultural varieties. The modern agricultural high technology is developed by leaps and bounds, and relying on technological innovation to constantly develop new varieties is a strategic choice for the international market of agricultural export. The cultivation of new agricultural varieties is not only the need for sustainable development of agriculture, but also the requirement of opening up international markets, expanding export scale, and enhancing the competitiveness of foreign trade.

Thus, firstly, it is necessary to increase investment in agricultural science and technology, and strengthen ties with universities and research institutes in "production, learning and research", to build a platform for the agricultural technology innovation.

Secondly, it is necessary to implement agricultural seeds innovation projects. Seeds, as the special, irreplaceable and most basic means of production for agricultural production, are the major carrier for a variety of agricultural production materials to play role, and also the key factor for increase in the agricultural production. Currently, Liaoning Province has cultivated a group of high-yield, high-quality new varieties of agriculture, and achieved remarkable results. On this basis, it is necessary to take technological innovation as the starting point, and regard the seeds innovation project as a system, to vigorously carry out agricultural breeding technology research, and implement the seed industrialization project. Thirdly, it is necessary to further carry out the training of farmer technicians and implement the training project of science and technology mission groups, technology correspondents and farmer technicians, to solve the talent bottleneck in the development of new varieties, and facilitate the promotion of new technologies, research and development and the introduction of new products^[3].

3.2.2 Using independent innovation to lead the international standards. In the trend of trade liberalization, the tariff barriers in international trade are increasingly weakened, and the space for the traditional non-tariff barriers has been shrinking. Technical barriers have become the primary means of national protectionism, and in the increasingly competitive trade of agricultural products, the impact of technical trade barriers is particularly significant. With advanced technology, Japan, the EU, the United States and other developed countries set up trade barriers, through the development of technical standards, technical regulations as well as health and quarantine regulations, even packaging and labeling stipulations. In the agricultural export of Liaoning Province, some products with comparative advantage, such as live animals, poultry products, aquatic products, honey, fruits, edible vegetables and tea, all suffer the technical barriers, affecting their competitiveness.

How to deal with technical trade barriers is an important issue for enhancing the competitiveness of agricultural export in Liaoning Province. In general, the "going out" form of enterprises can be divided into four levels, namely the level of commodity export, the level of capital export, the level of comprehensive capabilities export and the level of "Chinese standard" export, and "Chinese standard" export is a higher level of content^[4]. According to this thinking, the breakthrough of technical trade barriers to agricultural export in Liaoning Province should not be confined to linking product standards with international standards; it is necessary to stand at a strategic height to lead the international standards in the key technical indicators on the quality system authentication, in the current period when the international standards for the world market of agricultural products are being established. Therefore, in the agricultural sector, Liaoning Province should be based on independent innovation, to establish the internationally recognized technical standards with independent intellectual property. This is the condition the first-class agricultural enterprises

should have.

3.2.3 Using independent innovation to form brand agriculture. In today's international economic arena, more and more companies realize that only becoming the first-class manufacturer can not really win the international market, and only by owning independently developed brands can the export competitiveness be enhanced. The same is true for the agricultural enterprises. Continuing to produce the "heterogeneous" product and form the own brand is an important strategy to win in the international market. Without independent innovation, the production of "heterogeneous" products is out of the question.

The formation of agricultural export brand in Liaoning Province based on independent innovation, should follow the model "leading industry + leading enterprises + superior regions", and on this basis, focus on echelon development, to form the implementation project of brand agriculture with leading industry as support, and leading enterprises as the carrier. For the export-oriented industries of aquatic products, seafood, poultry meat, vegetables, fruits, grains and beans, dried nuts and pet food with comparative advantage and potential for development in Liaoning Province, it is necessary to increase capital investment, and encourage technological innovation, research and development activities. It is necessary to support the leading agricultural export enterprises with good prospects and strong innovation capacity, and create conditions conducive to the formation of large-scale leading enterprise group and multinational agribusiness; increase the investment in the research and development of superior export regions, to form innovative export base.

3.2.4 Using independent innovation to improve the industry chain. The low profit and high risk characteristics in the agricultural sector make the industrial chain management essential. The collaboration between the links in upstream, midstream and downstream of industry chain, has the function of value creation, and its integration has multiplier effect. At present, the international agricultural competition has become the competition between the agricultural industrial chains. Agricultural industry chain innovation has become an important aspect of independent innovation of enterprise^[5]. Based on the perspective of industry chain, in order to strengthen the competitiveness of agricultural export in Liaoning Province, it is necessary to focus on the following two aspects:

(i) Lengthening the agricultural industry chain, and implementing the agricultural industrial chain management "from short to long", "from the inside to the outside". "From short to long" means covering each links of industrial chain, from the seed supply before production, to production, processing, storage, and distribution. At the same time, we should be aware that the modern agricultural industrial chain is no longer confined to the primary industry, but includes the large-scale agriculture architecture of

secondary, tertiary industries and the industries related to agriculture. "From the inside to the outside" means allocating the optimal resources worldwide to promote the whole industry chain to operate in the international market, through cultivating transnational agricultural enterprises, not limited to domestic regions.

(ii) Seizing the favorable position in the industry chain^[6]. If the agricultural industry chain is divided into upstream, midstream and downstream industries, the midstream is farming, and the upstream and downstream links include providing production materials, processing product, and controlling supply and sales channels. Obviously, if there is only production capacity in the agricultural industry chain, it is difficult to be in a good position in the international division of labor. In the international agricultural competition, some developed countries keep in the high end of the value chain, through the control of critical resources, technology, market and the rules. Without independent innovation, it is impossible to be in an advantageous position in the industry chain. Liaoning Province should pay attention to seed innovation project, further develop the agricultural export and processing industry of aquatic products, seafood, vegetables, fruits and poultry meat, to achieve the change of agricultural products from the export of raw materials to deep processing, increase the value-added of agricultural exporting products, and improve the export competitiveness.

The reality of agricultural export competitiveness in Liaoning Province shows that it is a strenuous task for Liaoning Province to transform from a major exporter of agricultural products to strong export province; during the course, relying on independent innovation is the fundamental guarantee. It is necessary to enhance the independent innovation capability, to improve the agricultural export competitiveness in Liaoning Province. Therefore, it is a long-term and arduous task to increase science and technology input to agriculture, and create a favorable institutional environment for the enhancement of agricultural R & D capacity.

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