

Structural Change and Trend of Export Competitiveness on China's Agricultural Product

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ABSTRACT

Faced with increasingly complex situation on international competition, it is of great significance to effectively identify source of competitiveness effect and timely adjust competitive strategy for China's agricultural product. This paper systematically describes overall characteristics and structural change of agricultural export, and uses Constant Market Share model to clarify change trend and source. The results show that overall competitiveness effect rebounds obviously, and it is mainly due to specific competitiveness effect. Through second-order decomposition, structural effect is caused by structural interaction effect between product export and market agglomeration. In recent years, dynamic structural residual effect has changed from negative to positive, and this fully proves that interaction is increasingly obvious between specific market and specific agricultural export. It provides a scientific theoretical basis for competitive strategy implementation of product differentiation along the Belt and Road, and reconstructs supporting policy system oriented by competitiveness of China's agricultural product.

Keywords: export competitiveness, structural effect, CMS model

1. INTRODUCTION

As an important part of commodity export, it is an important reference to integrate into international market for China's agricultural product export. And it has important policy implications for China's initial accumulation of foreign exchange reserve, deepening structural reform of agricultural supply side, and enhancing international competitiveness of agriculture. China is an important market for international agricultural products. It has been weak for growth of export market share since 1995, but import share of agricultural product has doubled. The expanding trend of trade deficit is difficult to reverse. In particular, agricultural products have become effective measures and bargaining chips for China to fight back in the face of trade frictions provoked by US government since beginning of 2018. China's agricultural trade has become a hot topic of public opinion and academic circles again. However, many factors have hindered China's agricultural products from giving full play to their competitive advantages and expanding international market, such as weak demand in the international market, rising cost of domestic producing

factors, and rigid constraints of natural resources. The weakening of international competitiveness has become increasingly prominent. China's agricultural products have benefited from demographic dividend for a long time. Today, low-price competition strategy has gradually lost practical significance. However, there are optional differentiated competition strategies to enhance competitiveness in the future, like product quality, brand marketing, consumer preference, and cultural connotation. Therefore, it is quite necessary to clarify development context of international competitiveness, systematically analyze change mechanism of product structure, summarize evolution pattern characteristics, identify key influencing factors, and control future development trend. All above is of overall strategic and practical significance to enhance international competitiveness. At the same time, it provides adjusting basis for direction of China's agriculture development.

2. LITERATURE REVIEW

Through comprehensive analysis of literature published by government agencies, economists and researchers, it can be seen that scholars have not reached a consensus on the meaning of competitiveness

in research of economic theory (Kee, 2015). Main goal of carrying out economic policy is to improve competitiveness (Banse, 1999). But carrying out economic policy undoubtedly carries certain risk under the premise of controversial meaning of competitiveness (Anca, 2012; Krugman, 1994; Costinot, 2009).

From existing literature, definition of competitiveness mainly covers both macro-abstract expression of country and development of micro enterprise (Bolling, 2001; Jambor, 2016). For estimation and comparison of competitiveness, scholars at home and abroad mainly use econometric methods to build index system based on import and export data. Methods and index system for estimation can be roughly divided into two categories. Firstly, specific methods include trade competition, revealed comparative advantage, market share, market concentration index, constant market share based on data of import and export (Koopman, 2010; Upward, 2013; Díazbonilla, 2014; Peterson, 2000). Secondly, estimation is based on direct factors affecting competitiveness, such as price, production cost, and labor productivity (Heckman, 1990). Specific methods include domestic resource cost and spatial equilibrium model (Widodo, 2009). However, research on competitiveness has strong subjectivity in selection and judgment of estimation method and index system. Differences mainly focus on unclear boundary definition of research object.

3. EMPIRICAL METHODOLOGY

Analysis method of Constant Market Share (CMS) was first put forward in 1951. Later, it was mainly modified by Jepma (Jepma. C.J. ,1986) and became one important tool to measure trend of overall competitiveness and source of export growth for agricultural products in international market.

It assumes that export competitiveness of one commodity in a country remains unchanged in CMS model, thus its market share should not change. Therefore, the difference between actual change of a country's exports and change of competitors' exports must be caused by change of export structure or competitiveness. Through analyzing share of different effects in export growth of one commodity, it can calculate share of competitiveness contributing to export, and reveal sources of growth and factors restricting growth of export commodities. The hierarchical effect in CMS model and elements in competitive advantage theory corresponding to the model divide export of one product in a country into second-order effect. Specific decomposition formula is as follows:

$$\Delta v = \sum_k \sum_h r_{kh}^0 \Delta V_{kh} + \sum_k \sum_h V_{kh}^0 \Delta r_{kh} + \sum_k \sum_h \Delta r_{kh} \Delta V_{kh} \tag{1}$$

The first-order effect of formula (1) can be further decomposed into second-order effect as follows:

$$\Delta v = r^0 \Delta v + (\sum_k \sum_h r_{kh}^0 \Delta V_{kh} - \sum_k r_k^0 \Delta V_k) + (\sum_k \sum_h r_{kh}^0 \Delta V_{kh} - \sum_h r_h^0 \Delta V) \tag{2}$$

$$+ [(\sum_k r_k^0 \Delta V - r^0 \Delta v) - (\sum_k \sum_h r_{kh}^0 \Delta V_{kh} - \sum_h r_h^0 \Delta V_h)]$$

$$+ \Delta r V^0 + (\sum_k \sum_h \Delta r_{kh} V_{kh}^0 - \Delta r V^0) + (V^1 / V^0 - 1) \sum_k \sum_h \Delta r_{kh} V_{kh}^0$$

$$+ [\sum_k \sum_h \Delta r_{kh} \Delta V_{kh} - (V^1 / V^0 - 1) \sum_k \sum_h \Delta r_{kh} V_{kh}^0]$$

Meaning of each symbol in the formula is shown in table 4-1.

Table 1 Symbols and meanings in formula of CMS model

Symbol	Meaning
Δv	change in export of k-product in one country
r	export proportion of k-product for one country in world market
r_k	proportion of one country's k-product export in the world's k-product export
r_h	proportion of a country's export to h region in the world's export to h region
r_{kh}	proportion of a country's k-product exporting to h region in the world's k-product exporting to h region
V_k	export of k-product in world market
V_k	world export to h region
V_{kh}	world export of k product to h region

Data source: compiled by author

According to research need and product attribute, agricultural products are subdivided into 222 quartile codes in HS1992. And trade markets are divided into 204 countries/regions that have trade relations with China, in order to explore source of competitiveness and structural change.

Considering long time span, China's accession to World Trade Organization in 2001 is taken as dividing line in order to improve credibility, accuracy and explanatory power of model estimation. Thus the whole span is divided into two stages: 1995-2001 and 2002-2017. Moreover, many factors have been considered to affect growth of China's export competitiveness for agricultural products, such as US subprime mortgage crisis in2007 and the Belt and Road

initiative in 2013. The second half is divided into three sections: 2001 to 2006, 2007 to 2012, and 2013 to 2017. It should be noted that export data are all from UNcomtrade, and the statistical caliber of agricultural products is along with WTO plus aquatic products.

4. RESULTS AND DISCUSSION

According to theoretical basis and empirical setting, CMS model estimates growth power, decomposition and trend of China's agricultural exports in each research stage.

Estimated results show that competition effect accounts for only 12.61%, and structure effect accounts for 49.70% (see Table 2) in the growth of China's agricultural exports from 1995 to 2017. This shows that export growth mainly depends on stimulation of overall demand from international market, rather than

competitiveness improvement. By comparing results of two stages, contribution rate of competitiveness effect decreases from 116.84% to 9.41%. It further shows that international competitiveness is declining from strong to weak. Results of phased estimation more clearly depict declining track of competitive advantage. After accessing to World Trade Organization, China's agricultural products are directly facing international market competition, and endowment advantage is shrinking rapidly for agricultural factors. Contribution rate of competition effect continued to decline from 2.85% in 2006 to 31.30% in 2012. Lack of competitiveness and deterioration of competitive environment, market space has been phased compression. With the Belt and Road initiative and product value-added enhancement, contribution rate of competition effect to export growth rebounds to 26.38% from 2013 to 2017.

Table 2 Export growth estimated by CMS model Unit: US \$ billion, %

Index	(1) 1995-2017		(2) 1995-2000		(3) 2001-2017		(4) 2001-2006		(5) 2007-2012		(6) 2013-2017	
	Export value	contribution rate										
Export change	52.96	100%	2.97	100%	50.24	100%	15.08	100%	19.65	100%	8.00	100%
Structural effect	26.32	49.70%	-1.52	-51.18%	31.76	63.22%	7.48	49.60%	19.7	100.25%	5.51	68.88%
Growth effect	31.26	59.03%	-0.41	-13.80%	36.55	72.75%	12	79.58%	17.98	91.50%	0	0.00%
Market effect	-1480	-2794.56%	0.96	32.32%	-2167	-4313.30%	-698.3	-4630.64%	-1309	-6661.58%	-308.7	-3858.75%
Commodity effect	-3537	-6678.63%	240	8080.81%	-4597	-9150.08%	-1103	-7314.32%	-3244	-16508.91%	-269.7	-3371.25%
Structural interaction effect	5012	9463.75%	-242	-8148.15%	6765	13465.37%	1797	11916.45%	4515	22977.10%	583.9	7298.75%
Competitiveness effect	6.68	12.61%	3.47	116.84%	4.73	9.41%	4.72	31.30%	-0.56	-2.85%	2.11	26.38%
Overall competitiveness effect	7.2	13.60%	0	0.00%	4.56	9.08%	1.86	12.33%	1.14	5.80%	0	0.00%
Specific competitiveness effect	-0.52	-0.98%	3.47	116.84%	0.17	0.34%	2.86	18.97%	-1.7	-8.65%	2.11	26.38%
Second-order effect	19.96	37.69%	1.02	34.34%	13.75	27.37%	2.88	19.10%	0.51	2.60%	0.38	4.75%
Pure second-order effect	13.46	25.42%	-3.47	-116.84%	-4.73	-9.41%	-4.72	-31.30%	0.56	2.85%	-0.04	-0.50%
Dynamic structural residual effect	6.5	12.27%	4.49	151.18%	18.48	36.78%	7.6	50.40%	-0.04	-0.20%	0.42	5.25%

Data source: compiled by author

By decomposing competitiveness effect, we can explore its deep mechanism. Contribution rate of

overall competitiveness effect decreased from 12.33% to 0, while specific competitiveness effect increased from 18.87% to 26.38%. So far, competitiveness effect

all comes from specific competitiveness effect. This is reflected in the fact that China's specific agricultural products show strong competitiveness improvement in specific markets, which can often be explained as benefiting from diversification of geographical structure and effective market integration in trading partners.

Growth effect, structural interaction effect and dynamic structural residual effect boost export growth. Among them, structural interaction effect is the strongest, which indicates that interaction effect between upgrading of export structure and geographical agglomeration of export market is the most significant for export growth. Also, it has squeezed impact of growth effect recently. This is consistent with previous conclusion that specific competitiveness effect is significant. Dynamic structural residual effect shows that international competitiveness has improved rapidly in the markets with rapid growth of import demand.

Restriction effect mainly originates from market effect, commodity effect and pure second order effect. Among them, market effect and commodity effect are significantly negative in each year, and become main culprit to pull export growth down. However, their negative effects are offset by structural interaction effect. This further supports that China's agricultural export should continually adhere to national strategy of diversification. At the same time, it should pay attention to reverse unfavorable situation, optimize product structure and activate large-scale growth of export. Pure second-order effect shows that competitiveness is declining, and it is difficult for China to enjoy dividend brought by growth of global import demand. It is an inevitable choice for China's agricultural products to promote implementation of product differentiation strategy, open up diversified trade markets, stimulate market vitality of enterprises, and continually to exert the Belt and Road initiative.

In early stage of industrial transformation, land rent and agricultural labor price are at a low level. China's agriculture has more comparative advantages than other industries. However, with acceleration of industrialization process and deepening of international market cooperation, rising speed of domestic agricultural production cost is higher than that of foreign countries. Especially, after China has entered middle-or-medium term stage of industrialization, gap between agricultural and non-agricultural labor productivity level has gradually expanded. In the end, China's agriculture has rapidly lost its comparative advantage.

5. CONCLUSION

Overall competition effect of China's agricultural products rebound obviously, which is mainly due to

specific competitiveness effect. Structural effect shows that rising demand in global market stimulates growth of China's agricultural export. However, through second-order decomposition, it is found that structural effect is not caused by growth effect of world market, but by structural interaction effect between export structure and market agglomeration. In other words, overall demand of world market is weak, and reduces power to enhance competitiveness of China's agricultural product. To some extent, it has been playing a significant role in supporting competitiveness strategy of product differentiation along the Belt and Road. Dynamic structural residual effect has changed from negative to positive recently, and this fully proves that interaction effect caused by specific product export in specific markets is becoming increasingly prominent.

AUTHORS' CONTRIBUTIONS

Wang Xinghua, Zhao Min, Wu Shunchen, Li Xinyi contributed to the conception of the study;

Wang Xinghua, Zhao Min performed the framework;

Wang Xinghua, Wu Shunchen contributed significantly to analysis and manuscript preparation;

Wang Xinghua, Li Xinyi performed data analyses and wrote manuscript;

Zhao Min, Wu Shunchen helped perform the analysis with constructive discussions.

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