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A Competitive Analysis on the Agricultural Products of China and Thailand in the U. S. Market

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Abstract This paper selects China and Thailand as a reference object. Based on the U. S. market, it analyzes the export competitiveness of the agricultural products of China and Thailand by market share and growth rate, measures the agricultural products of China and Thailand export competition degree by export product similarity index and estimates the agricultural products of China and Thailand export competitiveness strength by shift share method. The results show that: At present, in the U. S. market, the competition of the agricultural products of China and Thailand is fierce, but export growth of China's agricultural products is faster and more competitive. Finally on how to further improve China's agricultural exports competitiveness in the U. S. market and promote China's agricultural export trade to the U. S. it puts forward the related countermeasures and suggestions.

Key words Export competitiveness, Export product similarity index, Shift share method

1 Introduction

Thailand, as a member of South - East Asian Nations (ASEAN), is a country famous for agricultural production and export. It is also the only net exporter of food in Asia and it has been hailed as a "granary" in Southeast Asia. The Agricultural product variety is diverse. Not only is rich in tropical fruits, coffee, jute, bamboo and wild medicinal materials, also is the world's largest exporter of cassava, rice and rubber. China is the largest agricultural exporter in Asia, a lot of agricultural products, such as grain, sugar, vegetable, fruit, livestock and poultry egg, their output is in the first place in the world. As traditional agricultural countries, the geographical location, natural conditions, the traditional production, technical level between China and Thailand are relatively similar, so does that mean China and Thailand agricultural products in the international market also have a strong competitive? China's agricultural products are more competitive or Thailand? In view of competitive characteristics of the products can be better reflected in the same export market, to China, the U. S. has been the most important agricultural products' export market, and to Thailand, the U. S. is the largest agricultural export source. Therefore this paper based on the U. S. market, discusses the competition of agricultural products between China and Thailand, in order to get the relevant conclusions. As for the agricultural product export competitiveness research, so far, it has achieved fruitful results, such as Bowen and Pelzman (1984), Traill & da Silva (1996), (Thorne, (2005), Qu Xiaobo *etc.* (2007), Maria Crescimanno, Antonino Galati (2012), *etc.*, but it is measured frequently by the world market share (WMS), revealed comparative advantage index (RCA), trade competitiveness index (TC) and intra-industry trade index (GL). In this paper, combining with the existing research literature, we try to adopt the market share and growth rate, export product similarity index and the method of shift share to study it.

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2 Research methods and data source

2.1 Research methods

2.1.1 Exports similarity index. The structure of export products is different, so it cannot fully reflect the degree of competition between countries by the market share and growth rate. We use Exports Similarity Index (ESI) to measure the degree of competition on China and Thailand in the U. S.. market. Its formula is:

$$ESI = \left[\sum_l \min\left(\frac{X_{iw}^l}{X_{iw}}, \frac{X_{jw}^l}{X_{jw}} \right) \right]$$

In the formula, X_{iw}^l and X_{jw}^l respectively is the l product's export of i country and j country in the w market, and X_{iw} and X_{jw} respectively is total export of i country and j country in the w market. The index changes in the range from 0 to 100. If the $ESI = 0$, said export commodity structure of i country and j country in the w market are completely different. If the $ESI = 100$, the export commodity structure of i country and j country in the w market are completely the same. If ESI is more close to 100, the export commodity structure of two countries is more similar, and the more competitive in the world market or the third party trade.

2.1.2 Shift share method. Shift share method is a kind of approach to measure the export competitiveness (Herschede F, 1991; Voon J P, 1998/2003; Wilson P, 2005; Du Li, 2011). In this paper, with reference to Du Li (2011) description of shift share method, the shift share method is to study the export performance of every country relative to the reference group that need to compare several countries. As a reference group to study the export performance relative to the reference group, and the individu-

al country in the reference group known as competitor. NS means net transfer, it reflects the national export competitiveness condition. When net transfer is greater than 0, it suggests that the country has export competitive advantage compared with other countries. When net transfer is less than zero, it shows the country has export competitive disadvantage, AC (Actual Change in export) means the change of the actual export, SE means share effect. Theirs formulas are as follows:

$$NS = AC - SE \quad (1)$$

$$AC = X^t\ li - X^0\ li \quad (2)$$

$$SE = X_i^0 P_{lr}^0 G_{lr} \quad (3)$$

X_{li}^0 and X_{li}^t are respectively l product export of i country in the early period and t period. X_i^0 iis total export of i country in the early period. P_{lr}^0 is that the proportion of l product export in the reference group accounted for of its total export. G_{lr} is l product export growth in the reference group in [0, t] period.

Net transfer is the result of joint action of three sub effects, namely the industry structure effect (ISE), competitive effect (CE), and interactive effect (IE). Theirs formulas are as follows:

$$NS = ISE + CE + IE \quad (4)$$

$$ISE = X_i^0 (P_{li}^0 - P_{lr}^0) Gir \quad (5)$$

$$CE = X_i^0 P_{lr}^0 (G_{li} - G_{lr}) \quad (6)$$

$$IE = X_i^0 (P_{li}^0 - P_{lr}^0)(G_{li} - G_{lr}) \quad (7)$$

P_{li}^0 is that the proportion of l product export in i country accounted for of its total export. G_{li} is l product export growth in i country in [0, t] period.

2.2 Data source In this paper, we use The Harmonized Commodity Description and Coding System, that's HS classification. Agricultural products are defined as products from Chapter 1 to 24 in HS classification. All of its data is from the UN COMTRADE Database. We adopt HS classification by Interception of China's and Thailand's agricultural trade data to the U. S. from 2001 to 2012.

3 The calculation results and analysis

3.1 The present situation of the agricultural products of China and Thailand in the U. S. market The market share and the export growth of the agricultural products of China and Thailand in the U. S. market from 2001 to 2012 are shown in Table 2, 3, we can draw the following conclusions:

(i) The market share of China's agricultural product in the U. S. market is higher than Thailand's. In 2012, the market share of China's agricultural product in the U. S. market is 5.57%, and Thailand's is 2.28%, China's is higher than that of Thailand. But before 2002, it is the opposite. This shows that after joining the WTO, The export quota of China's agricultural products is greatly increased. But the whole proportion is not high, the two countries' share is much lower than the top three countries Canada (18.65%), the European Union (13.53%) and Mexico (12.74%) in 2012. China and Thailand have great potential for agricultural product's export to the U. S.

(ii) China's overall export growth rate is faster than Thailand's to the U. S. market. From 2002 to 2012, China's average growth is 18.1%, and Thailand's is 6.36%. Specific to each year, with the exception of 2009, China is affected by the financial crisis, the agricultural product export growth is negative at less than Thailand, the rest of the year is positive, and all higher than that of Thailand.

Table 1 The market share of the agricultural products of China and Thailand in the U. S. market from 2001 to 2012 Unit:%

Country	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
China	2.19	2.77	3.32	3.27	3.65	4.38	4.74	5.02	5.1	5.6	5.51	5.57
Thailand	3.55	3.08	3.26	2.97	2.99	3.27	3.06	3.2	3.57	3.67	3.44	2.88

Source: UN COMTRADE Database.

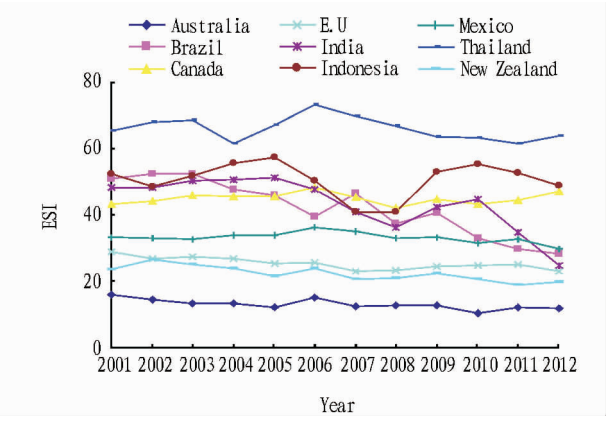
Table 2 The export growth of the agricultural products of China and Thailand in the U. S. market from 2001 to 2012 Unit:%

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average
China	34.1	27.5	12	21.7	33.8	17.1	15.03	−7.55	22.42	15.98	6.86	18.1
Thailand	−8.1	12.7	3.43	9.95	22.2	1.28	13.34	1.46	14.68	10.56	−11.7	6.36

Source: UN COMTRADE Database.

3.2 The competition level of the agricultural products of China and Thailand in the U. S. market In order for better analysis, in addition to Thailand, this paper chooses other eight major agricultural exporters in the U. S., using their ESI indexes as a comparison. The result is shown in Fig. 1.

From the Fig. 1, it is found that agricultural products' export similarity index of China and Thailand to the U. S is the highest. From 2001 to 2012, the average of the ESI, China's and Thailand's to the U. S is the highest. It is 65.94, much higher than the second, Indonesia (50.61). From the numerical year by year, Thailand also keeps the export similarity highest compared with China. It means that agricultural export commodity structure of China is most similar to Thailand's, China and Thailand exist the most intense competition. From the point of change trend, Agricultural products' export similarity index of China and Thailand to the U. S first rises then falls, but changes slowly, basic remains above 60. This shows that competition situation of China's and Thailand's will not change in the near future. From the point of specific agricultural products, in 2012, the high contact ratio of the agricultural products of China and Thailand are (3), (16) and (20) chapters. Their values were 16.7, 16.8, 15.4. compared with the other chapters of agricultural products, these agricultural products are the most competitive in the U. S. market.



Source: UN COMTRADE Database.

Fig. 1 The ESI indexes of Thailand, China and other eight major exporters in the U. S. market

3.3 The competitiveness strength of the agricultural products of China and Thailand in the U. S. market We will use the shift share method to analyze the competitiveness strength of the agricultural products of China and Thailand. the reference group consists of China and Thailand, and the data from 2001 20 2012 is divided into three periods: from 2001 to 2004, from 2005 to 2008, from 2005 to 2012 (It is divided this because suffering from the impact of the global financial crisis in 2009, China's trade of agricultural products is affected, then into the recovery period, we take this period years into a period of time. Based on this we put the front are divided into two periods). The calculation results are as follows:

Table 4 The competitiveness strength of the agricultural products of China and Thailand by shift share analysis Unit: 10^6 dollars

Period	NS	ISE	CE	IE
2001 – 2004	630.34	144.38	1224.12	–738.16
2005 – 2008	505.16	–219.25	2266.11	–1541.70
2009 – 2012	766.15	182.94	717.04	–133.82

Source: UN COMTRADE Database.

Table 5 The NS of the agricultural products of China and Thailand of every chapter Unit: 10^6 dollars

NS	01	02	03	04	05	06	07	08	09	10	11	12
2001 – 2004	2.39	2.37	292.94	10.87	59.69	1.22	62.74	23.03	22.47	–13.46	0.50	16.35
2005 – 2008	5.37	–0.76	–102.84	–2.98	0.15	–0.31	54.10	11.25	14.12	–89.47	–1.62	17.82
2009 – 2012	–0.64	–0.86	214.19	2.47	36.99	1.92	41.38	3.52	28.29	–15.29	–8.85	45.50

NS	13	14	15	16	17	18	19	20	21	22	23	24
2001 – 2004	–8.34	–0.50	3.43	5.46	17.32	1.84	7.14	107.44	17.91	2.22	–2.17	–2.53
2005 – 2008	17.86	0.29	4.34	182.32	31.03	12.38	–16.48	273.63	2.10	3.13	94.02	–4.29
2009 – 2012	41.90	1.88	18.89	120.14	–9.95	–2.66	8.19	164.83	–10.73	5.66	81.47	–2.08

Source: UN COMTRADE Database.

Table 6 The competitiveness strength of the agricultural products of China and Thailand by shift share analysis from 2009 to 2012 Unit: 10^6 dollars

Index	01	02	03	04	05	06	07	08	09	10	11	12
NS	–0.64	–0.86	214.19	2.47	36.99	1.92	41.38	3.52	28.29	–15.29	–8.85	45.50
ISE	–0.60	–0.81	15.10	–0.19	37.71	–1.68	46.26	9.51	25.90	–15.31	–10.87	44.20
CE	–0.02	–0.03	181.53	2.98	–0.43	5.21	–3.03	–4.46	1.46	6.13	3.62	0.82
IE	–0.01	–0.02	17.55	–0.31	–0.29	–1.62	–1.85	–1.53	0.94	–6.11	–1.60	0.48

Index	13	14	15	16	17	18	19	20	21	22	23	24
NS	41.90	1.88	18.89	120.14	–9.95	–2.66	8.19	164.83	–10.73	5.66	81.47	–2.08
ISE	42.85	1.23	15.00	–122.89	9.53	–2.46	–5.04	28.18	–17.25	3.84	80.66	0.07
CE	–0.59	0.45	2.52	384.93	–13.02	–0.12	15.29	126.06	7.51	1.38	0.59	–1.76
IE	–0.35	0.20	1.37	–141.90	–6.47	–0.09	–2.06	10.59	–1.00	0.44	0.22	–0.39

Source: UN COMTRADE Database.

3.3.1 The NS analysis. From the overall value of agricultural products, compared with Thailand, China's agricultural product is competitive in U. S. market. Examining three periods, China's NS values are positive, and are big, which suggests that China is the competitive advantage, and advantage is big in the agricultural export to the U. S. From the specific agricultural product, in examining the three periods China's agricultural products are positive in (5), (7), (8), (9), (12), (15), (16) and (20), (22) chapter, that's to say China is competitive compared with Thailand. China's agricultural products are negative in (10), (24) chapter, that's to say China is in a competitive disadvantage. NS values turned negative from positive in(01), (02), (11), (17), (18), (21) chapter, that's to say China is loss of competitive advantage in these agricultural products. They are no longer competitive; NS values become positive from negative in (13), (14), (23) chapter, which shows that China is from competitive disadvantage into advantage on these products.

3.3.2 Three sub-effects of NS. The ISE values of the first period and the third period are positive, that China's agricultural competitiveness is part from the structure effect of export proportion of ascension. The CE values are all positive and big, which explain China's agricultural products are export competitive mainly brought by the acceleration effect. The IE values are negative, indicating the interaction effect of China's agricultural structure effect and competition effect is negative, and China should expand export of agricultural products which have competitive advantage. From the

point of the specific product, we take the period from 2009 to 2012 for example, the values the structure effect, competition effect and interaction effect are all positive in (3), (9), (12), (14), (15), (20), (22) and (23) chapter, which shows that export competitiveness of these agricultural products benefit by industrial structure effect from rising export proportion and competition effect from export speed-up. China's export quantity on these agricultural products is also large. The values of structure effect, competition effect and interaction effect are all negative in (01), (02), (18) chapter. It shows that these products' export quotas drop compared to Thailand, export competitiveness is negative from export speed slowing down. Structure effect is negative, the competition effect is positive, and interaction effect is negative in (04), (06), (10), (11), (16), (19), (21) chapter. It shows that although these agricultural products have competitive advantage, because China's export commodity structure is unreasonable, it makes these products not competitive. Structure effect is positive, the competition effect is negative, and interaction effect is negative in (05), (07), (08), (13), (17), (24) chapter, which shows that although these products' export quotas are big, export structure of China's agricultural product is reasonable, export growth is slow, they have not competitive advantage.

4 Conclusions and recommendations

4.1 Conclusions We can draw the following conclusions through the competitiveness of China's and Thailand's agricultural in the U. S. :

First, at present, the market share of China's agricultural products in the U. S. market is higher than that of Thailand. The export growth of China's agricultural products is faster than that of Thailand.

Second, the export similarity of the agricultural products of China and Thailand is high, and there is fierce competition between them.

Third, as a whole, China's agricultural product is more competitive than Thailand's agricultural product in the U. S. market. From the point of specific product, at present, China has competitive in(03), (04), (05), (06), (07), (08), (09), (12), (13), (14), (15), (16),(19), (20), (22) and (23) chapter, and not competitive (01), (02), (10), (11), (12), (13), (15),(17), (18), (21), (24) chapter.

4.2 Recommendations First, it is necessary to strengthen the government support for export trade of agricultural products and promote agricultural export to the U. S. Thailand's agricultural trade has maintained a trade surplus, which is inseparable with support policy on agricultural trade of Thailand's government, such as government financial institutions lending to support farmers, being free to provide professional vocational skills' training, promoting rural fund plan, *etc*. China's agricultural products have strong competitiveness, but China's agricultural trade has maintained a trade deficit, so Chinese government can draw lessons from Thailand to strengthen the government support for export trade of agricultural products, then promote agricultural export to the U. S.

Second, it is necessary to implement agricultural product differentiation strategy and develop "dislocation competition". The export similar degree of China's and Thailand's agricultural products in the U. S is high. It has become fierce competition. Therefore, we can implement product differentiation strategy, and develop "dislocation competition" in order to avoid loss at both sides brought by excessive competition.

Third, it is necessary to optimize the agricultural export commodity structure, and speed up advantageous agricultural product export to the U. S. We should take advantage of China's agricultural resources diversity and low labor cost to optimize the agricultural export commodity structure. China's aquatic products, vegetables, fruits, nuts, and meat products are of competitive advantages, therefore, we should speed up these agricultural products' export growth, and prompt China's agricultural export change from overall growth to unbalanced growth.

Fourth, it is necessary to fully grasp the U. S. market demand for agricultural products, and develop competitive advantage of key agricultural export. It is necessary to fully understand the U. S. market demand for agricultural products, develop good agricultural development and sales plan, promote the agricultural product trade development with the U. S. For example, green, organic agricultural products are more and more popular to American consumer, China can support and encourage green, organic agricultural production, and develop competitive advantage of green, organic agricultural products.

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