Export Competitiveness of Agri-Products Between China and Central Asian Countries: A Comparative Analysis

LA COMPETITIVITE DES EXPORTATIONS DES PRODUITS D'AGRO-ALIMENTAIRE ENTRE LA CHINE ET L'ASIE CENTRALE: UNE ANALYSE COMPARATIVE

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Abstract

This paper analyzes export competitiveness of agri-products between China and Central Asian Countries by revealed comparable advantage index and trade competitiveness index, and then comes to the following conclusions: (1) China's total agri-products do not have comparable advantage, while Central Asian Countries have changed from comparable advantage into comparable disadvantage; (2)The total agri-products of both China and Central Asian Countries have changed from trade competitive advantage into trade competitive disadvantage; (3)China and Central Asain Countries, on specific categories of agri-products, have different advantage structures, which presents vast bilateral trade potential on the basis of comparable advantage.

Key words: China; Central Asian Countries; Agri-products; Competitive advantage

Résumé

Cet article analyse la compétitivité des exportations des produits d'agro-alimentaires entre la Chine et l'Asie centrale par l'indice de l'avantage révélé comparables et l'indice de compétitivité commerciale, puis arrive aux conclusions suivantes: (1) Chine totale agro-produits n'ont pas d'avantages comparables, tandis que pays d'Asie centrale ont changé depuis avantage comparable en désavantage comparables, (2) Le total des produits agro-alimentaires de la Chine et d'Asie centrale ont changé depuis avantage commercial concurrentiel dans le commerce désavantage concurrentiel; (3) Chine centrale et les pays Asain, sur des catégories spécifiques des produits agroalimentaires, ont des structures différentes parti, qui présente un vaste potentiel commercial bilatéral sur la base d'avantages comparables.

Mots clés: Chine; Pays d'Asie centrale; Produits d'Agro-alimentaire; Avantage concurrentiel

INTRODUCTION

In recent years, the research on export competitiveness and complementarity of agri-products in regional areas has received wide interests. LV Lingli(2004) made comparative analysis on export comparable advantage of total and main agri-products between china and ASEAN countries with revealed comparable advantage, and then indicated that the comparable advantage of china's total agri-products is lower than that of main ASEAN countries, whereas China's processed agri-products appeared stronger comparable advantage. LI Xingyuan and MEI Yan (2005) calculated the revealed comparable advantage index and export similarity index, and examined the trade relationship of agri-products between China and ASEAN Countries, then indicated that trade complementarity took the leading role. YAO Haihua (2006) compared the agri-trade of china and main northeast Asia countries by revealed comparable advantage index, trade complementarity as well as Trade intensity index, and then pointed out that comparable advantage of China was increasing in both Sino-Japan and Sino-Russia, while it was declining in Sino-Korea. Korinek, J. and M. Melatos (2009) provided an in-depth examination of the trade effects of three regional trade agreements(RTAs)-the ASEAN Free Trade Agreement (AFTA), the Common

Market for Eastern and Southern Africa (COMESA) and the Southern Cone Common Market (MERCOSUR)-in the agricultural sector, and then came to the result with a gravity model that the creation of AFTA, COMESA and MERCOSUR have increased trade in agri-products among their member countries.PANG Deliang and Zheng Qiongjie(2010) made comparative analysis on agri-export competitiveness between China and Japan and South Korea by market similarity index, revealed comparable advantage index and net export index, and then indicated that the comparable advantage of china's agri-products in Japan and South Korea has the upward trend.

China and Central Asian Countries, on the trade of agri-products, not only have competitiveness, but enjoy complementarity, owing to possess unique attributes, different endowments and distinct differences on agri-process, agricultural resources and market demands respectively. LIU Yingjie and MA Huilan(2009) overall investigated the export competitiveness of main agri-products between Xinjiang and Central Asia Countries by applying revealed comparable advantage index, net export index and international market share and then highlighted trade complementarity and existed problems. Li Yuxin and Zhu Xinxin(2010) concluded that Central Asian Countries have abundant agricultural resources and appear distinct complementarity with China, considering Xinjiang's special advantages, there exists vast cooperation potentials for Central Asian Countries and China in the field of agricultural trade, technology and investment. To date, however, comparative study on agri-export competitiveness and complementarity of China and Central Asian Countries is seldom found in the literature. This paper, adopting the revealed comparable advantage index and the export competitiveness index,will overall make comparison on agri-export competitiveness of China and Central Asian Countries from the perspective of total and six categories of agri-products respectively

1. DATA AND ANALYSIS METHODS

1.1 Data Sources

1.1.1 The Definition of Agri-Products
Based on the agreement of agriculture and the harmonized commodity description and coding system, we define the agricultrual prodcuts as follows:HS Code 01 to 24(the fish and fish products included) and together with HS Code2905.43(mannitol), HS Code 2905.44(sorbitol), HS Code33.01 (essential oils), HS Code 35.01 to 35.05(albuminoidal substances,modified starches, glues), HS Code 3809.10(finishing agents), HS Code 3823.06(sorbitol n.e.p.), HS Code 41.01to 41.03(hides and skins), HS Code 43.01(raw furskins), HS Code 50.01 to 50.03(raw silk and silk waste), HS Code 51.01 to 51.03(wool and animal hair), HS Code 52.01-52.03(raw cotton, waste and cotton carded or combed), HS Code

53.01(raw flax), HS Code 53.02(raw hemp).

As to overall assess the export competitiveness of agri-products of China and Central Asian Countries, we divide the total agri-products into six categories with respect to HS classification. Section 1 is live animal products (HS Code 01 to 05); Section 2 is vegetable products (HS Code 06 to 14); Section 3 is Animal or Vegetable Fats products(HS Code15); Section 5 is cotton products(HS Code 52.01-52.03); section 6 is other agri-products (other remaining products).

1.1.2 Data from UN COMTRADE Database
The UN COMTRADE DATABASE is widely recognized as relatively authoritative database which contains trade flows data of more than 160 countries since 1962 for nations and products respectively. From this database, we obtain the agri-products data for China, Central Asian Countries as well as the world.

1.2 Analysis Methods

1.2.1 Index of Revealed Comparable Analysis (RCA)
To capture the degree of trade specialization of one country, Balassa (1965) publicized the revealed comparative advantage (RCA) index as follows:

$$\text{RCA}_1 = \frac{X_{iv} / X_t}{X_{wv} / X_w} \tag{1}$$

Because RCA index can greatly reduce the influence of total export volume between countries and the world, here we apply this index to calculate revealed comparative advantage of agri-products between China and Central Asian Countries. Where X_{iv} is the export value of county i's total agri-products to the world, X_t is the total export value of county i's all products to the world, X_{wv} is the export value of total agri-products of the world, X_w is the total export value of all products of the world. Equation (1) is used to calculate the revealed comparable advantage of total agri-products.

For better investigate the RCA of 6 categories of agri-products, we get the following equation (2) on made adjustments for equation 1 and its variables.

$$\text{RCA}_2 = \frac{X_{ijv} / X_{ta}}{X_{wjv} / X_{wa}} \tag{2}$$

Where X_{ijv} is the export value of country i's agri-product j to the world, X_{ta} is the export value of country i's total agri-products to the world, X_{wjv} is the total export value of agri-product j of the world, X_{wa} is the total export value of agri- products of the world.If RCA is higher than 1, indicating that the country i has comparable advantage for total or specific category agri-products,vice versa.

1.2.2 Trade Competitiveness Index (TC)
Trade competitiveness index (TC) is a ratio of one

country's net exports of products with its total trade volume, which is widely used to describe the international competitiveness of one country's specific product or industry. Its formula is expressed as:

$$TC_1 = \frac{X_i - M_i}{X_i + M_i} \qquad (3)$$

Where X_i and M_i are the total export and import value of county i's agri-products respectively.

Similarly, we also make adjustments for equation (1) as to investigate trade competitiveness of specific category products, therefore, we obtain the equation (2) as follows:

$$TC_2 = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}} \qquad (4)$$

Where X_{ij} and M_{ij} are the export and import value of county i's agri-product j respectively.

The index range of (-1, 1), generally, if TC=-1, meaning that only imported not exported and the country i doesn't have any trade competitive advantage; if TC is greater than -1 and lower than 0, indicating that it doesn't have trade competitive advantage; If TC is greater than 0 and lower than 1, showing that it has stronger trade competitive advantage; if TC=1, meaning that only exported not imported and it has the strongest trade competitive advantage.

2. EMPIRICAL RESULTS

2.1 Comparable Analysis on Export Competitiveness of Total Agri-products

2.1.1 Revealed Comparable Advantage (RCA)

Analysis

Table 1 is the RCA Index of total agri-products of China and Central Asian Countries during the period of 2002-2009, from which we can find that:

The RCA indices of China's total agri-products are always lower than 1, and with the trend of gradual decrease, and have dropped from 0.69 in 2002 to 0.38 in 2009, which indicate that China's total agri-products do not hold comparable advantage, even its competitiveness has yearly deteriorated.

The RCA indices of agri-products of Central Asian Countries also share the trend of decline, and have decreased from 1.40 in 2002 to 0.70 in 2009. whereas the RCA indices are always higher than 1 during 2002-2007, which can represent that total agri-products of Central Asian countries enjoy comparable advantage, but turn into comparable disadvantage in 2008-2009, with the RCA indices being lower than 1.

From the perspective of the RCA index of total agri-products of each country among Central Asian Countries,during the period of 2002-2009, We can conclude that, total agri-products of Uzbekistan, Tajikistan and Kyrgyzstan always have comparable advantage, whereas that of Kazakhstan and Turmenistan do not.

Observing from the changing trends, the comparable advantage of both Uzbekistan and Kyrgyzstan are on downward trend, with their indices dropping from 5.75 and 3.28 in 2002 to 2.27 and 1.79 in 2009 respectively;the comparable advantage of Tajikstan appear volatile trend, with the RCA indices being higher than 1, the highest is 5.08 in 2004. however, the total agri-products of Kazakhstan do not enjoy comparable advantage, with the RCA indices being lower than 1, the lowest is 0.43 in 2005.Those of Turkmenistan overall do not hold comparable advantage, with the RCA indices being lower than 0.5 except 1.22 in 2009.

Table 1
RCA Index of Total Agri-products of China and Central Asian Countries

	2002	2003	2004	2005	2006	2007	2008	2009
China	0.69	0.61	0.52	0.50	0.48	0.42	0.38	0.38
Central Asian Countries	1.40	1.51	1.40	1.04	1.06	1.04	0.72	0.70
Kazakhstan	0.78	0.91	0.68	0.43	0.49	0.66	0.59	0.46
Kyrgyzstan	3.28	2.29	2.48	2.73	2.74	2.51	1.83	1.79
Uzbekistan	5.76	5.65	6.33	5.49	5.06	3.78	1.87	2.27
Tajikistan	3.86	4.12	5.08	3.72	3.87	3.41	4.12	3.96
Turkmenistan	0.33	0.28	0.45	0.32	0.41	0.49	0.24	1.22

Sources: Calculated by authors based on UN COMTRADE DATABASE.

2.1.2 Trade Competitiveness (TC) Analysis

Table 2 is the TC Index of total agri-products of China and Central Asian Countries during the period of 2002-2009, from which we can find that total agri-products of both China and Central Asian Countries have changed from trade competitive advantage into trade competitive disadvantage, with their TC indices gradually decreasing and being lower than 0 since 2008.

From the perspective of the TC index of total agri-products of each country among Central Asian Countries,We can conclude that, total agri-products of Uzbekistan always enjoy trade competitive advantage,

whereas Turkmenistan seldom hold, Kyrgyzstan, Kazakhstan and Tajikistan have changed from

trade competitive advantage into trade competitive disadvantage.

Table 2
TC Index of Total Agri-products of China and Central Asian Countries

	2002	2003	2004	2005	2006	2007	2008	2009
China	0.19	0.12	0.03	0.09	0.14	0.04	-0.11	-0.09
Central Asian Countries	0.25	0.31	0.32	0.16	0.17	0.13	-0.02	-0.14
Kazakhstan	0.09	0.18	0.07	-0.18	-0.13	0.00	0.05	-0.14
Kyrgyzstan	0.20	0.06	0.01	-0.14	-0.27	-0.31	-0.43	-0.47
Uzbekistan	0.59	0.71	0.76	0.69	0.73	0.58	0.12	0.06
Tajikistan	0.22	0.20	0.24	0.04	-0.06	-0.11	-0.19	-0.08
Turkmenistan	-0.30	-0.46	-0.07	-0.14	0.03	0.14	-0.36	-0.33

Sources: Calculated by authors based on UN COMTRADE DATABASE.

Observing from the changing trends, the trade competitive advantage of Uzbekistan has upward and downward trends, with the TC changing ups and downs, the lowest(0.06) in 2009. The TC indices of Kyrgyzstan appear on the decline, and decend from 0.20 in 2002 to -0.47 in 2009.The TC indices of Kazakhstan appear volatile change, and mainly be below 0 since 2005. The TC indices of Tajikistan hold the trend of increase and decrease, and become lower than 0 since 2006.The TC indices of Turkmenistan are higher than 0 only in some individual years.

2.2 Analysis on Export Competitiveness of Specific group Agri-products

2.2.1 Revealed Comparable Advantage (RCA) Analysis

Based on the results of RCA index of six categories of agri-products in 2009 (see table 3), we can find that China's live animal products,vegetable products, Prepared Foodstuffs products and other agri-products have comparable advantage, with their RCA indices being 1.07,1.04,1.07 and 1.32 respectively, among which the comparable advantage of other agri-products is quite obvious, whereas Animal or Vegetable Fats products and

Cotton products are not, because their RCA indices are 0.17 and 0.06 respectively.

See from the perspective of Central Asain Countries, we can conclude that:

Live animal products do not have comparable advantage, with the RCA index of 0.22.Among Central Asian Countries, the RCA indices being 0.25 (Kazakhstan), 0.69 (Kyrgyzstan), 0.06 (Uzbekistan), 0.17 (Tajikistan) and 0.02 (Turkmenistan) respectively, which represents they do not have comparable advantage.

Vegetable products have comparable advantage, with the RCA of 0.22.Among Central Asian Countries, Turkmenistan has comparable disadvantage with the RCA(0.89), while other countries have higher comparable advantage, with their RCA indices being 2.60 (Kazakhsta), 1.56(Kyrgyzstan), 1.70 (Uzbekistan) and 2.18 (Tajikistan) respectively.

Animal or vegetable fats produts do not hold comparable advantage, with the RCA index of 0.25. Among Central Asian, their indices being 0.33 (Kazakhstan), 0.61 (Kyrgyzstan), 0.07(Uzbekistan), 0.02 (Tajikistan) and 0.09 (Turkmenistan) respectively, which indicate that they do not share comparable advantage.

Table 3
RCA Index of 6 Categories Agri-products of China and Central Asian Countries in 2009

	Live animal products (HS01-05)	Vegetable Products (HS06-14)	Animal or Vegetable Fats Products (HS15)	Prepared Foodstuffs products (HS16-24)	Cotton products (HS52.01-03)	Other Agri-products
China	1.07	1.04	0.17	1.07	0.06	1.23
Central Asian Countries	0.22	0.22	0.25	0.20	22.14	0.43
Kazakhstan	0.25	2.60	0.33	0.22	5.95	0.19
Kyrgyzstan	0.69	1.56	0.61	0.52	14.45	0.97
Uzbekistan	0.06	1.70	0.07	0.14	49.49	0.44
Tajikistan	0.17	2.18	0.02	0.06	31.61	0.96
Turkmenistan	0.02	0.89	0.09	0.03	83.62	1.67

Sources: Calculated by authors based on UN COMTRADE DATABASE.

Prepared foodstuffs products do not hold comparable advantage, with the RCA index of 0.25. Among Central Asian Countries, their indices being 0.22 (Kazakhstan), 0.52 (Kyrgyzstan), 0.14 (Uzbekistan), 0.06 (Tajikistan)

and 0.03 (Turkmenistan), which show that they do not share comparable advantage.

Cotton products enjoy stronger comparable advantage, with the RCA index of 22.14. Among Central Asian

Countries, the RCA indices being 5.95(Kazakhstan), 14.45 (Kyrgyzstan), 49.49 (Uzbekistan), 31.61 (Tajikistan), 83.62 (Turkmenistan) respectively, which explain they hold strong comparabel advantage, especially Turkmenistan enjoys the strongest comparable advantage.

Other agri-products do not hold comparable advantage, with the RCA index of 0.43. Among Central Asain Countries, Turkmenistan, with the RCA index of 1.67, has comparable advantage, however, other countries do not, with their indices being 0.19 (Kazakhstan), 0.97 (Kyrgyzstan), 0.44 (Uzbekistan), 0.96 (Tajikistan).

2.2.2 Export Competitiveness (TC) Analysis

Based on the results of TC index of six categories of agri-products (see table 4), we can find that China's live

animal products and Prepared Foodstuffs products have trade competitive advantage, with their TC indices being 0.17 and 0.43 respectively, whereas Vegetable Products, Animal or Vegetable Fats products, Cotton products and Other Agri-products do not, with their TC indices are -0.35, -0.92 -0.92 and -0.59 respectively.

See from the perspective of Central Asian Countries, we can conclude that:

Live animal products do not have trade competitive advantage, with the TC index of -0.60. Among Central Asian Countries, their TC indices being -0.64 (Kazakhstan), -0.40 (Kyrgyzstan), -0.51 (Uzbekistan), -0.53 (Tajikistan) and -0.95 (Turkmenistan) respectively, which represents they do not have trade competitive advantage.

Table 4
TC Index of Agri-productsof China and Central Asian Countries in 2009

	Live animal products (HS01-05)	Vegetable Products (HS06-14)	Animal or Vegetable Fats Products (HS15)	Prepared Foodstuffs products (HS16-24)	Cotton products (HS52.01-03)	Other Agri-products
China	0.17	-0.35	-0.92	0.43	-0.98	-0.59
Central Asian Countries	-0.60	0.27	-0.77	-0.78	1.00	-0.02
Kazakhstan	-0.64	0.53	-0.65	-0.79	0.99	-0.36
Kyrgyzstan	-0.40	-0.25	-0.75	-0.74	0.98	0.03
Uzbekistan	-0.51	0.02	-0.94	-0.57	1.00	-0.12
Tajikistan	-0.53	0.03	-0.97	-0.87	1.00	0.93
Turkmenistan	-0.95	-0.45	-0.93	-0.98	1.00	0.52

Sources: Calculated by authors based on UN COMTRADE DATABASE.

Vegetable products have trade competitive advantage, with the TC index of 0.27.Among Central Asian Countries, Uzbekistan and Tajikistan have trade competitive advantage, with their TC indices being 0.53, 0.02 and 0.03 respectively. However, that of Kyrgyzstan and Turkmenistan do not, with the TC being -0.25 and -0.45 respectively.

Animal or vegetable fats products do not hold trade competitive advantage, with the TC index of -0.77. Among Central Asian, the TC indices being -0.65(Kazakhstan), -0.75 (Kyrgyzstan), -0.94 (Uzbekistan), -0.97 (Tajikistan) and -0.93 (Turkmenistan) respectively, which represent that they do not have trade competitiveness.

Prepared foodstuffs products do not hold trade competitive advantage, with the TC index of -0.78. Among Central Asian Countries, the TC indices being -0.79 (Kazakhstan), -0.74 (Kyrgyzstan), -0.57 (Uzbekistan),-0.87 (Tajikistan) and -0.98 (Turkmenistan), which explain that they hold strong trade competitive disadvantage.

Cotton products enjoy the strongest trade competitive advantage, with the TC index of 1.00. Among Central Asian Countries, the TC indices being 0.99 (Kazakhstan), 0.98 (Kyrgyzstan), 1.00 (Uzbekistan), 1.00 (Tajikistan), 1.00 (Turkmenistan) respectively, which indicate that they share the strongest trade competitive advantage.

Other agri-products do not hold trade competitive advantage, with the TC index of -0.02. Among Central Asain Countries, Kyrgyzstan, Tajikistan and

Turkmenistan have trade competitive advantage, with the TC indices being 0.03, 0.93 and 0.52 respectively. however,Kazakhstan and Uzbekistan do not,with the TC index of -0.36 and -0.12 respectively.

CONCLUSIONS AND IMPLICATIONS

Based on the revealed comparative advantage(RCA) index and trade competitiveness(TC) index, we calculate and compare agri-export competitiveness of China and Central Asain Countries from the perspective of both total and six categories of agri-products, then come to the following conclusions.

(1) From the aspect of total agri-products, China does not have comparable advantage, while Central Asian Countries has changed from comparable advantage into comparable disadvantage. Moreover, both China and Central Asian Countries have changed from trade competitive advantage into trade competitive disadvantage. Among Central Asian Countries, Uzbekistan,Tajikistan and Kyrgyzstan have comparable advantage; meanwhile, Uzbekistan has trade competitive advantage, while Tajikistan and Kyrgyzstan have change from trade competitive advantage into trade competitive disadvantage.Kazakhstan and Turkmenistan do not have comparable advantage, and seldom bear any trade competitive advantage.

(2) From the aspect of six categories of agri-products,

China's cotton prodcuts have obviously comparable disadvantage and trade competitive disadvantage. However, Central Asian Countries always appear stronger trade competitiveness. China's vegetable products do not hold trade competitive advantage, but have comparable advantage, whereas Central Asian Countries do not have comparable advantage, but enjoy stronger trade competitive advantage. China's live animal products and prepared foodstuffs products not only hold comparable advantage, but have trade competitive advantage, whereas Central Asian Countries do not.Both China and Central Asian Countries wholly do not have export comparable advantage and trade competitiveness on animal or vegetable Fats products.

(3) Given the above conclusions, we can sumarize that competiveness structures of China and Central Asain Countries on specific category of agri-product are to some extent different, which presents vast bilateral trade potential on the basis of comparable advantage. Consequently, china should actively reinforce agri-trade and cooperation with Central Asain Country for deeply utilizing different agircultural endowments and comparable advantage to realize high agri-specialisation.

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