A Study on Trade of Complementarity

among Xinjiang and Its Neighboring Countries

Xinshu Gong

School of Economics & Trade, Shihezi University

Shihezi 832003, China

Tel: 86-993-205-8996   E-mail: gxsjm10@sohu.com

Chengjun Gu

School of Economics & Trade, Shihezi University

Shihezi 832003, China

E-mail: sfp10@sina.com

Abstract

Using the revealed comparative advantage index and the trade complementarity index, this paper studies the revealed comparative advantages and structural complementarities of export products of Xinjiang and its neighboring countries. The study indicates that, on the view of revealed comparative advantage, the electronic products, machinery and miscellaneous manufactured products made in Xinjiang and China's mainland have significant comparative advantages; on the view of trade complementarity, the trade complementarity indexes of imports among Xinjiang and its neighboring countries are decreasing, while the trade complementarity indexes of exports among Xinjiang and its neighboring countries show are ascending; on the view of the revealed comparative advantage and the trade complementarity, the trade structures among Xinjiang and its neighboring economies are mainly complementary, and subsidiarily competitive.

Keywords: Xinjiang, Revealed comparative advantage, Trade complementarity, Trade structure

1. Introduction

The Xinjiang's neighboring countries include 11 countries as follows: Russia, Mongolia, Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan, Tajikistan, Afghanistan, Pakistan, Iran, and India. Connected with the second Eurasian continental bridge, the region of Xinjiang and its neighboring countries is very extensive, east to Southeast Asia, west to Europe, south to Pakistan and India, and north to Russia and Mongolia. Xinjiang has high-quality and relatively cheap goods, and its neighboring countries have huge markets, abundant natural resources. There is a long history of trade among Xinjiang and its neighboring countries. Under the background of globalization developing faster and faster, it can be not only to achieve win-win outcomes, but also very necessary to expand and strengthen the trade further.

2. The revealed comparative advantage of Xinjiang's exports

The revealed comparative advantage index (RCA) is a ratio of A/B, where A stands for the export value of a commodity of a country or region divided by the total export value of all commodities of a country or region, and B stands for the export value of the very commodity of the world divided by the total export value of all commodities of the world. The calculation formula of the revealed comparative advantage index is

$$RCA_{ij} = \frac{X_{ij} / X_{it}}{X_{wj} / X_{wt}}$$

where RCAij is the revealed comparative advantage index of the commodity marked j of the region marked i, Xij is the export value of the commodity j of the region i, Xit is the total export value of all commodities of region i, Xwj stands for the export value of the very commodity j of the world, and Xwt stands for the total export value of all commodities of the world. If RCAij >1, it indicates that this kind of commodity has the revealed

comparative advantage in the country or region, otherwise, the formula RCAij <1 indicates that this kind of commodity has not the revealed comparative advantage in the country or region. Generally speaking, on the current international standards, RCAij >2.5 means more strong revealed comparative advantage, 2.5>RCAij >1.25 means strong revealed comparative advantage, 1.25>RCAij >0.8 means less strong revealed comparative advantage, and RCAij <0.8 means weak revealed comparative advantage.

The data this paper used comes from the United Nations Trade Database, and its usage is the Standard International Trade Classification (SITC) Rev.1. The SITC divides all the trade commodities into ten categories, which are mostly the primary products of 0-4 categories; the labor-intensive manufactured products of Category 6, and 8; the capital or technology-intensive type of products of category 5, 7 and 9. The export of various products in Xinjiang revealed comparative advantage index are presented in Table 1. In Table 1, X stands for Xinjiang; S0, S1,…, S9 are SITC0, SITC1,…, SITC9.

In the exports of Xinjiang from 2005 to 2007, the RCA indexes of three categories , which are miscellaneous manufactured articles (SITC8), products divided by raw materials (SITC6), food and live animals (SITC0), are higher than 0.8. It indicates that the three categories have less strong competitive advantages. The RCA index of miscellaneous manufactured articles (SITC8) is higher than 2.5, it shows that this category has more strong competitive advantage. The RCA index of food and live animals (SITC0) is higher than 1.25 and lower than 2.5, it shows that this category has less strong competitive advantage.

On the other hand, the RCA indexes of beverages and tobacco (SITC1), agricultural raw materials (SITC2), mineral raw materials (SITC3), plant and animal oils and fats (SITC4) and three types of capital or labor-intensive manufactured articles (SITC5, SITC7, SITC9) have no comparative advantages in the exports of Xinjiang from 2005 to 2007. As to agricultural raw materials (SITC2), except that the RCA index is 1.184 in 2005, the RCA indexes are lower than 0.8. As to products divided by raw materials (SITC6), except that the RCA index is 1.421 in 2007, the RCA indexes are lower than 0.8. As to plant and animal oils and fats (SITC4), the RCA indexes are even lower than 0.1. As to SITC9, that the RCA indexes are 0 indicates that it has no revealed comparative advantage. So, the exports of miscellaneous manufactured articles (SITC8) of Xinjiang have strongest revealed comparative advantage, and the exports of plant and animal oils and fats (SITC4) of Xinjiang has weakest revealed comparative advantage.

3. The revealed comparative advantage of the neighboring countries' exports

In order to compare, this paper selects 6 neighboring countries and the inland of China to study, and the 6 Xinjiang's neighboring countries are Kazakhstan, Kyrgyzstan, India, Russia, Pakistan, and Mongolia. Using the same research methods of studying the revealed comparative advantage of Xinjiang's exports and the relative date (the date of the year to 2004 included) from the United Nations Trade Database, the researched outcomes of the above 7 are shown in Table 2. In Table 2, X1, X2, X3, X4, X5, X6, X7 stands for the inland of China, Kazakhstan, Kyrgyzstan, India, Russia, Pakistan, Mongolia; S0, S1,…, S9 are SITC0, SITC1,…, SITC9.

As for the inland of China (X1) from 2004 to 2007, the RCA index of miscellaneous manufactured articles (SITC8) is higher than 1.25 and lower than 2.5, it shows that this category has strong competitive advantage. That the RCA index of SITC8 becomes smaller and smaller shows that the revealed comparative advantage of SITC8 has gradual downward tendency. The RCA index of mechanical and electrical equipment, transport equipment and office communications equipment (SITC7) is bigger than 0.8 and smaller than 1.25. So, the category of SITC7 has less strong comparative advantage and gradual upward tendency. The RCA indexes of other categories are smaller than 0.8, and show weak revealed comparative advantages, and gradual downward tendency (SITC0, SITC1, SITC2, and SITC3) or gradual upward tendency (SITC4, SITC5, and SITC9). So, the category of exports of miscellaneous manufactured articles (SITC8) has strongest revealed comparative advantage, and the category of the others (SITC9) has weakest revealed comparative advantage.

The category of fossil fuels (SITC3) of Kazakhstan (X2) has very strong revealed comparative advantage, and the category of non-food fuel (SITC2) has strong revealed comparative advantage. Generally speaking, the category of products divided by raw materials (SITC6) has less strong revealed comparative advantage. The other categories (SITC0, SITC1, SITC4, SITC5, SITC7, and SITC8) have weak revealed comparative advantages. That the RCA index of the others (SITC8) is 0 indicates that Kazakhstan exports no such category product.

The categories of beverages and tobacco (SITC1) and agricultural raw materials (SITC2) of Kyrgyzstan (X3) have very strong revealed comparative advantages, and the revealed comparative advantage of agricultural raw materials (SITC2) is the strongest. Kyrgyzstan's food and live animals (SITC0) has strong revealed comparative advantage, and Kyrgyzstan's metal products and non-metallic products (SITC6) has less strong revealed

comparative advantage. The other categories (SITC4, SITC5, SITC7, SITC8, and SITC9) have weak revealed comparative advantages.

India's (x4) food and live animals (SITC0), non-edible fuel (SITC2), products divided by raw materials (SITC6), miscellaneous manufactured articles (SITC8) have strong revealed comparative advantages, and the categories of SICT3, SICT4 and SICT5 have less strong revealed comparative advantages. The other categories (SITC1, SITC7, and SITC9) have weak revealed comparative advantages.

The categories of mineral raw materials (SITC3) and the others (SITC9) of Russia (X5) have very strong revealed comparative advantages, and the revealed comparative advantage of mineral raw materials (SITC3) is the strongest. Russia's non-edible fuel (SITC2) has strong revealed comparative advantage, and its metal products and non-metallic products (SITC6) has less strong revealed comparative advantage. The other categories (SITC0, SITC1, SITC4, SITC5, SITC7, and SITC8) have weak revealed comparative advantages.

As for Pakistan (X6) from 2004 to 2007, the categories of products divided by raw materials (SITC6) and miscellaneous manufactured articles (SITC8) have very strong revealed comparative advantages, and the categories of SITC1 and SITC4 have strong revealed comparative advantages. The other categories (SITC1, SITC2, SITC3, SITC5, SITC7, and SITC9) have weak revealed comparative advantages.

Except that the category of agricultural raw materials (SITC2) has very, very strong revealed comparative advantage and the category of miscellaneous manufactured articles (SITC8) has less strong revealed comparative advantage, Mongolia's (X7) other categories (SITC0, SITC1, SITC3, SITC4, SITC5, SITC6, SITC7, and SITC9) have weak revealed comparative advantages.

In summary, the compare shows that there are certain complementarities among Xinjiang and the inland of China, India, and Pakistan; there are strongly complementarities among Xinjiang and Kazakhstan, Kyrgyzstan, Russia as well as Mongolia.

4. Analysis of trade complementarity

The calculation formula of the trade complementarity index is

$$Cij = \sum \{(RCA_{mjk} \times RCA_{xik}) \times (W_k / W)\}$$

where RCAmik stands for the revealed comparative advantage of imports of product k of country i; RCAxjk stands for the revealed comparative advantage of exports of product k of country j.

Selecting 5 neighboring countries: Mongolia (X7), Pakistan (X6), Russia (X5), India (X4), and Kazakhstan (X2), and using the research methods of analyzing the export-trade complementarity and the relative date from the United Nations Trade Database, the researched outcomes are shown in Table 3.

Table 3 shows that, the complementarity indexes are all higher than 0.8 among Xinjiang's exports and its three neighboring countries' imports (Mongolia, Russia and Kazakhstan). It indicates that there very strong trade complementarities among Xinjiang's exports and its three neighboring countries' imports (Mongolia, Russia and Kazakhstan). However, the complementarity indexes of exports are about 0.6 among Xinjiang's exports and its two neighboring countries' imports (Pakistan and India). It indicates that the trade complementarities among Xinjiang's exports and its two neighboring countries' imports (Pakistan and India) need to be strengthened. Generally speaking, the complementarity indexes among Xinjiang's exports and its neighboring countries' imports have downward tendency. This reflects that the demand of Xinjiang's import is decreasing.

Using the similar research methods of analyzing the export-trade complementarity and the relative date from the United Nations Trade Database, the researched outcomes of analyzing the import-trade complementarity are presented in Table 4.

Obviously, The trade complementarities of Xinjiang's imports and its 5 neighboring countries' exports are bigger than the trade complementarities of Xinjiang's imports and its 5 neighboring countries' exports, and the trade complementarity of Xinjiang's imports and Mongolia' exports is the strongest. The complementarity indexes are all higher than 1.2 among Xinjiang's imports and its four neighboring countries' exports (Pakistan, Russia, India, and Kazakhstan). So, these indicate there are good developments and co-operations among Xinjiang and its neighboring countries. Generally speaking, the complementarity indexes among Xinjiang's exports and its neighboring countries' imports have upward tendency. This reflects that the demand of Xinjiang's export will continuously increase.

5. Conclusion

On the view of revealed comparative advantage, the electronic products and machinery and miscellaneous manufactured products of Xinjiang have significant comparative advantages, and they are important industries to develop. On the view of trade complementarity, the complementarity indexes among Xinjiang's exports and its neighboring countries' imports have downward tendency, and the complementarity indexes among Xinjiang's exports and its neighboring countries' imports have upward tendency. That the demand of Xinjiang's import is decreasing and the demand of Xinjiang's export will continuously increase will keep Xinjiang's foreign trade surplus status in a longer period of time in the future. On the views of revealed comparative advantage and trade complementarity, the study indicates that the trade structure among Xinjiang and its neighboring economies is mainly complementary, and subsidiarily competitive. So, there is no doubt that such trade structures are good at the trade development and cooperation among Xinjiang and its neighboring countries.

References

Gao, Zhigang. (2005). Strategic Position and Cooperative Trend of Regional Open among Xinjiang and Five Central Asian Countries. *Journal of the Open Report*, No.1.

Sang, Jinrong. (2005). Strategic Thinking on Building the processed Manufacturing Base between Xinjiang and Middle Asia Zone. *Russian Central Asian & East European Market*, No.3.

Wang, Haiyan. (2002). An Analysis on the complementarity of Economic Cooperation among Xinjiang and Five Central Asian Countries. *East European & Central Asian Market Research,* No.2.

Wei, Xiaobo. (2006). Outlooks of the Surveys of Xinjiang's Neighboring Countries and the Economic Complementarities among China and Xinjiang's Neighboring Countries. *Journal of Financial Visual Angle*, No.6.

Table 1. RCA index of Xinjiang exports form 2005 to 2007

Region	Time	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
	2005	1.577	0.172	1.184	0.143	0.089	0.342	0.958	0.163	4.701	0.000
X	2006	1.493	0.175	0.458	0.332	0.011	0.348	0.952	0.152	4.823	0.000
	2007	1.418	0.128	0.213	0.138	0.063	0.332	1.421	0.143	4.989	0.000

Resource: Edited from the United Nations Trade Database.

Table 2. Analyzing outcomes of the inland of China and 6 neighboring countries

Region	Time	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
X1	2004	0.611	0.242	0.319	0.258	0.062	0.411	1.211	1.091	2.410	0.071
	2005	0.573	0.191	0.308	0.191	0.083	0.428	1.200	1.122	2.387	0.072
	2006	0.538	0.161	0.242	0.138	0.101	0.429	1.254	1.153	2.366	0.083
	2007	0.482	0.132	0.213	0.112	0.125	0.522	1.277	1.178	2.202	0.092
X2	2004	0.731	0.177	2.047	7.221	0.142	0.237	1.441	0.041	0.021	0.000
	2005	0.433	0.119	1.751	5.443	0.081	0.302	1.182	0.032	0.021	0.000
	2006	0.528	0.163	1.428	5.552	0.091	0.388	1.183	0.051	0.017	0.000
	2007	0.606	0.144	1.333	6.133	0.101	0.278	1.232	0.053	0.033	0.000
X3	2004	2.231	5.021	6.897	2.271	0.081	0.221	1.261	0.351	0.621	0.409
	2005	2.801	4.661	5.833	1.529	0.032	0.488	1.300	0.311	0.783	0.012
	2006	1.722	3.622	3.432	0.938	0.057	0.096	0.898	0.202	0.577	1.269
	2007	1.844	4.707	4.708	1.454	0.077	0.323	1.033	0.345	0.677	0.245
X4	2004	1.641	0.452	2.192	0.930	1.097	1.101	2.561	0.251	1.353	0.402
	2005	1.532	0.407	2.232	0.921	0.789	1.122	2.338	0.292	1.342	0.332
	2006	1.558	0.428	2.135	1.195	0.732	1.103	2.115	0.291	1.293	0.405
	2007	1.535	0.503	2.277	0.988	0828	1.055	2.325	0.277	1.276	0.521
X5	2004	0.221	0.171	1.580	5.922	0.141	0.411	1.210	0.160	0.070	4.012
	2005	0.252	0.221	1.417	4.98	0.225	0.391	1.040	0.112	0.055	2.789
	2006	0.253	0.231	1.162	5.021	0.383	0.361	1.002	0.110	0.062	2.892
	2007	0.255	0.245	1.333	5.356	0.372	0.378	1.005	0.133	0.078	3.031
X6	2004	1.731	0.191	0.792	0.272	1.037	0.223	3.377	0.101	2.548	0.022
	2005	2.158	0.212	0.632	0.341	1.642	0.292	3.345	0.045	2.427	0.028
	2006	2.222	0.242	0.558	0.393	1.598	0.251	3.210	0.053	2.611	0.021
	2007	2.356	0.271	0.626	0.282	1.603	0.277	3.522	0.113	2.568	0.027
X7	2004	0.435	0.032	18.21	0.445	0.012	0.021	0.442	0.012	1.821	0.115
	2005	0.291	0.051	19.76	0.453	0.043	0.011	0.465	0.032	1.202	0.092
	2006	0.401	0.051	22.83	0.422	0.012	0.012	0.375	0.045	0.608	0.042
	2007	0.445	0.056	25.78	0.503	0.017	0.013	0.382	0.056	1.035	0.077

Resource: Edited from the United Nations Trade Database.

Table 3. Trade complementarities of Xinjiang's exports and its 5 neighboring countries' imports

		X7	X6	X5	X4	X2
X	2005	0.828	0.521	0.864	0.632	0.772
	2006	0.801	0.532	0.848	0.572	0.812
	2007	0.828	0.535	0.878	0.592	0.882

Resource: Edited from the United Nations Trade Database.

Table 4. Trade complementarities of Xinjiang's imports and its 5 neighboring countries' exports

		X7	X6	X5	X4	X2
X	2005	5.142	2.042	1.291	2.419	1.538
	2006	6.532	1.722	1.512	2.432	1.738
	2007	7.532	1.272	1.353	2.356	1.832

Resource: Edited from the United Nations Trade Database.