Trade Dependence and Complementarity of China and Central and Eastern European countries

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Abstract

Objective: Primary target of this paper is to analyze trade dependency and complementarily of China and central and eastern European countries, explain compact degree trend of bilateral economic and trade cooperation, as well as intuitively predict bilateral trade developing trend in the future. **Findings:** Both bilateral trade dependency of China and central and eastern European countries are in lower level. Compared with other countries in the world, the trade of China to central and eastern countries is not important for both countries so far, while exporting dependency of China to central and eastern European countries is higher than exporting dependency of central and eastern European countries to China. Trade complementarity of China and central and eastern European countries is obvious and just higher than world average level, it also enhance gradually, this obvious complementarity was mainly caused by different factor endowments, comparative advantages and different stages of export trade structure. Labor intensive products, such as finished products classified by materials, miscellaneous products and capital and technology-intensive products, such as mechanical engineering and transportation equipment among them have higher complementarity.

Key Words: Trade Dependence, Trade Complementarily, China, Central and Eastern European

1. Introduction

The cooperation of politics, economy and trade between China and central and Eastern European countries began to be increasingly intensified at the beginning of the 21st century, as well as the bilateral trade relationship was intensified gradually. (Kong &Dong 2015) Take the trade scale as the example, the bilateral trade volume was just 3.3 billion US dollars at the end of the 20th century; it reached 4.3 US dollars in 2001; (Wang 2007&Zhang 2013)while increased 14 times sharply to 60.2 billion US dollars in 2014; it declined slightly to 56.3 billion US dollars until 2015.(Tong 2015) Especially since global financial crisis, the global economic aggregate and trade level has declined, while the bilateral trade level of China and central and eastern European

countries raised and the compound annual growth rate reached 6.52%, so central and eastern European countries become the trade cooperative partners with great importance of China.

There are huge trade potentials between China and central and eastern European countries, while there are still spaces to the further bilateral economic and trade cooperation. In order to explore the bilateral trade promise, this article will de-structure the tightness of bilateral trade and economic cooperation, as well as predict the future bilateral developing trend more directly through analyzing the bilateral trade combination degree and complimentarily.

2. Trade combination degree

Trade combination degree (TCD) refers to the specific value of the proportion of export amount of exporting countries to importing countries account for the total domestic export amount and the proportion of importing countries' total importing volume account for the total world importing volume, which reflects the combination degree of exporting and importing aspects of exporting countries and importing countries to each other. The following is the specific formula:

$$TCD_{ij}=(X_{ij}/X_i)/(M_j/M_w)$$

In the formula, X_{ij} is the exporting volume of i country to j country, X_i is the total exporting volume of i country, M_j is the total importing volume of j country, and M_w is the global total importing volume. TCD_{ij} actually reflects the TCD compared the combination degree of i country to j country with average combination degree of the global exporting to j country(M_j/M_w). If TCD_{ij} =1, the combination degree of i country to j country is the average global level. Bring panel data to the formula, we can calculate the TCD of China to 16 central and eastern European countries in 2015, as well as the 21years' TCD of China to the overall central and eastern European countries from 1995 to 2015, shows as Table1 and Table 2.

Table 1.Degree of dependence of China's trade with CEE countries (2015)

Trade dependence	Estonia	Latvia	Lithuania	Poland
China to Central and Eastern Europe	0.45	0.54	0.31	0.55
Central and Eastern Europe to China	0.18	0.12	0.05	0.14
Trade dependence	Czech Republic	Slovakia	Hungary	Slovenia
China to Central and Eastern Europe	0.44	0.28	0.42	0.59
Central and Eastern Europe to China	0.17	0.29	0.29	0.09
Trade dependence	Croatia	Romania	Serbia	Bosnia
China to Central and Eastern Europe	0.35	0.33	0.17	0.05
Central and Eastern Europe to China	0.09	0.21	0.10	0.10
Trade dependence	Montenegro	Bulgaria	Albania	Macedonia
China to Central and Eastern Europe	0.48	0.26	0.73	0.10
Central and Eastern Europe to China	0.69	0.29	0.66	0.30

Table2.Degree of dependence of China's trade with CEE countries from 1995-2015

Trade dependence	1995	1996	1997	1998	1999	2000	2001
China to Central and Eastern Europe	0.35	0.31	0.31	0.34	0.35	0.39	0.44
Central and Eastern Europe to China	0.21	0.15	0.09	0.07	0.13	0.12	0.14
Trade dependence	2002	2003	2004	2005	2006	2007	2008
China to Central and Eastern Europe	0.42	0.43	0.37	0.36	0.51	0.42	0.45
Central and Eastern Europe to China	0.16	0.17	0.13	0.12	0.11	0.12	0.12
Trade dependence	2009	2010	2011	2012	2013	2014	2015
China to Central and Eastern Europe	0.47	0.50	0.48	0.45	0.43	0.42	0.42
Central and Eastern Europe to China	0.14	0.16	0.18	0.18	0.18	0.19	0.19

The two tables show that both the bilateral TCDs of China and central and eastern European countries to each other are in relative low level. During the 21 years from 1995 to 2015, the highest TCD of China to central and eastern European countries in 2006 is 0.516, which never exceeded 0.5 in other years, which the TCD of central and eastern European countries to China has never exceeded the level of 0.2 in 1995. This suggests that China should strengthen the technical level, promote higher industrial development, such as mechanical engineering and transportation equipment manufacturing industry, enhance the TCD of central and eastern European countries to China, as well as promote the stable progress of bilateral economic and trade cooperation.

By analyzing the situation of every country, Albania owns the highest TCD of 0.73 of China to 16 central and eastern European countries in 2015while the Republic of Montenegro owns the highest TCD of 0.69 of 16 countries to China, which explains that compared with other areas in the world, neither the trade of China nor the 16 countries are important to each other so far, while the exporting combination degree of China to central and eastern European countries is higher than the exporting combination degree of central and eastern European countries to China. It suggests that central and eastern European countries are gradually become the important trade partners and exporting markets of China at present, it is necessary to improve trade cooperative efficiency, dig out trade potential and expand trade space of bilateral parties, while the Chinese strategy of "the

Belt and Road" initiative is just an opportunity; in order to improve the bilateral economic and trade relationship, especially to laid a profound foundation and good beginning for Chinese exporting market, China should cooperate with central and eastern European countries closely and strengthen the relationship.

By analyzing the developing trend, during the 21 years from 1995 to 2015, the TCD of China to 16 central and eastern countries is relative stable and rise lowly; while the TCD of central and eastern countries to China had raised greatly since 1998, which declined until 2003 when turbulent political situation of central and eastern European countries occurred, and it is relatively stable rise after 2006. This suggests the importance of Chinese market to central and eastern European countries, and gradually become stronger, especially under the situation with no political influences, however, China gradually become the important trade partner of central and eastern European countries after overcoming the global financial crisis and European debt crisis.

By analyzing the data, over the past 21 years, neither China nor the central and eastern European countries is important market to each other, while both the literal TCD has improved in recent years, especially the TCD of central and eastern European countries to China increases rapidly, under the stagnant background of European economy and with the gradually promotion of Chinese "the Belt and Road" initiative, as well as the gradually construction of the economic belt of the Silk Road, the bilateral trade of China and central and eastern European countries is facing stable growth stage and has huge developing space in the future.

3.**Goods Trading Complementarity of China and Central and Eastern European Countries**

The bilateral economic and trade cooperative developing potential of China and central and eastern European countries is huge, while it needs guiding and operability to explore the potential. According to the theory of comparative advantage, because different countries or regions have different factors possessions and they produce different efficiencies in different commodities, so it will be decisive to the foreign economic and trade structures of the country or region. According to the standard international trade classification (SITC rev.3), then this article will analyze the trade structural complementarily in the trading process of all kinds of commodities.

Trade complementarily index is used to measure structural complementarily of goods trading between two countries, which was presented by Petet Drysdale in 1967, he believed that there is complementarily in the bilateral trade of the sort of products between the two countries when the integrated exporting products of exporting countries are accordance with the integrated importing products of importing countries. The following is the formula to calculate the trade complementarily index (C_{ij}) between i country and j country:

$$C_{ij}=\sum_k C_{ij}^k \frac{x_w^k}{x_w}=\sum RCA_{xi}^k RCA_{mj}^k * \frac{x_w^k}{x_w}$$

In the formula, $C_{ij}^k=RCA_{xi}^k * RCA_{mj}^k$ represents the two countries' complementarity index of K products in the bilateral trade; RCA_{xi}^k represents the exporting integrated extent of k products of i country, RCA_{mj}^k represents the importing integrated extent of k products of j country, that are the index formulas of comparative advantage and disadvantage of the two countries in k products:

$$RCA_{xi}^k=\frac{x_{i/x_i}^k}{x_{w/x_w}^k}$$

$$RCA_{mj}^k=\frac{x_{j/x_j}^k}{x_{w/x_w}^k}$$

In the two formulas above, X_i^k and X_i respectively represents the exporting volume of k products and the sum exporting volume of i country; point X_w^k and X_w respectively represents the exporting volume of k products and the sum exporting volume in the world; M_j^k and M_j respectively represents the importing volume of k products and the sum volume of j country. The bigger indexes in the formulas above, the bigger comparative advantages and disadvantages of k products respectively in i country and j country, the bigger $RCA_{xi}^k * RCA_{mj}^k$, the stronger complementarily of the two countries in bilateral trade.

On the basis of this, take the proportion of k products exporting account for the global sum exporting volume as weight coefficient, then sum up the complementarily indexes of all kinds of products to get the two countries' comprehensive trade complementarily index C_{ij}, it means the complementarily of the two countries in bilateral trade is strong when the index is greater than 1, otherwise it means the complementarily of the two countries in bilateral trade is weak. By applying the formula and according to SITC rev.3 from UNCTAD database, classify the whole bilateral trade panel data of China and central and eastern European countries to get the calculation:

Tab 3 Trade complementarity index of China's trade with CEE countries from 1995 to 2015

	SIT C-0	SIT C-1	SIT C-2	SIT C-3	SIT C-4	SIT C-5	SIT C-6	SIT C-7	SIT C-8	SIT C-9	C_{tf}
1995	1.04	0.67	0.97	1.42	0.45	0.92	1.08	0.44	2.47	0.04	1.00
1996	1.08	0.63	0.91	0.98	0.51	0.90	1.64	0.50	2.56	0.01	1.00
1997	0.96	0.45	0.76	1.12	0.67	0.84	1.68	0.55	2.52	0.02	1.01
1998	0.91	0.41	0.68	0.79	0.32	0.76	1.69	0.63	2.50	0.00	1.01
1999	0.83	0.35	0.73	0.44	0.13	0.72	1.73	0.68	2.46	0.02	1.00
2000	0.91	0.26	0.68	0.34	0.15	0.72	1.84	0.76	2.27	0.03	0.99
2001	0.78	0.25	0.56	0.36	0.13	0.64	1.82	0.86	2.06	0.02	0.99
2002	0.71	0.23	0.50	0.36	0.07	0.57	1.81	0.97	2.05	0.01	1.02
2003	0.65	0.18	0.40	0.26	0.05	0.49	1.79	1.13	1.94	0.02	1.03
2004	0.57	0.20	0.33	0.22	0.05	0.45	1.76	1.17	1.78	0.01	1.00
2005	0.63	0.20	0.32	0.19	0.08	0.52	1.86	1.28	1.91	0.05	1.05
2006	0.58	0.17	0.23	0.11	0.08	0.49	1.84	1.30	1.88	0.07	1.03
2007	0.54	0.16	0.19	0.12	0.04	0.50	1.80	1.41	1.89	0.03	1.06
2008	0.48	0.15	0.20	0.11	0.05	0.59	1.88	1.55	2.03	0.02	1.08
2009	0.52	0.17	0.16	0.12	0.04	0.50	1.70	1.57	1.92	0.02	1.05
2010	0.53	0.17	0.15	0.11	0.03	0.56	1.67	1.57	1.88	0.01	1.04
2011	0.53	0.19	0.16	0.10	0.03	0.67	1.82	1.62	1.98	0.01	1.06
2012	0.53	0.19	0.16	0.09	0.04	0.64	1.88	1.58	1.99	0.01	1.05
2013	0.51	0.18	0.15	0.08	0.04	0.63	1.94	1.60	1.99	0.01	1.07
2014	0.47	0.18	0.16	0.08	0.04	0.65	1.98	1.50	1.97	0.01	1.06
2015	0.50	0.22	0.18	0.15	0.07	0.66	2.23	1.61	2.00	0.01	1.14

Comprehensive trade complementarily index of China and Central and Eastern European countries appeared fluctuating growth in total from 1995 to 2015 and basically above 1 stably, which explains that the goods trade complementarily of China and Central and Eastern European countries is relative stronger and positively appears increasingly growth trend; by analyzing the bilateral integrated extent of exporting and importing, the importing integrated extent of central and eastern European countries from China is far higher than the exporting integrated extent of China to central and eastern European countries($RCA^k_{xi} > RCA^k_{mj}$), which fit into the bilateral production factors possession and comparative advantages.

By analyzing classification of goods, there are differences of complementary industries or products of goods trading in China and central and eastern European countries.

The complementarity of 0 goods (foods and live animal) and 5 goods (chemical and relevant products) is weak. And the complementarity of 0 goods is gradually declining, while the complementarity of 5 goods is gradually growing among them. Both 1-4 goods and 9 goods (drinks, cigarettes and tobacco, un-edible raw materials, mineral fuel, lubricating oil and relevant raw materials, animal and vegetable oil, was and other non-classified goods of SITC) appears extreme weak and even no complementarity. The complementarities of 6-8 goods （finished product classified by materials, mechanical engineering and transportation equipment, as well as sundry goods）are high which above 1.5. Both 6 goods and 8 goods belong to labor-intensive products and have the biggest complementarity which above 2; while the trade complementarity index of mechanical engineering and transportation equipment goods grow obviously, these goods are typical capital and technological intensive products, the trade amount has accounted for nearly 60% of the sum bilateral trade at present, which shows the impact of capital and technological intensive products in trade between China and 16 central and eastern European countries on the total trade complementarity are increasingly growing that conform to the comparative advantages of bilateral trading parties.

4. Conclusion

In general, the goods trade complementarity of China and central and eastern European countries is strong which higher than the average world level and appears gradually growth trend, it mainly because the different factors possession and comparative advantages of bilateral parties and different stages of exporting trade structures, thus appears strongly complementarity. The labor-intensive products, such as finished product and sundry goods classified by materials and capital and technological intensive products, such as mechanical and engineering, as well as transportation equipments have higher complementarity among them, so China should enhance the relative industrial development to promote the stability and progress of bilateral economic and trade cooperation more effectively.

With the gradually promotion of Chinese “the Belt and Road” strategy, central and eastern European countries has become the bridge towers of China to European routes, the economic and trade cooperation and friendship between China and central and eastern European countries are warming up rapidly. As the country has entered into new normal, China has strong complementary effect with central and eastern European countries in foreign trading, so it is important to China to output excess capacity. There are still many problems in economic and trade cooperation between China and central and eastern European countries by the empirical analysis of this article, as well as many trade efficiency factors and big hindrance, while the trade volume growth potential is huge in the future.

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