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Study on the Trade Complementarity among China and CEE Countries

Lingling Yang

Zhejiang International Studies University, China

Abstract: Under the "the Belt and Road" and the "17+1" framework, trade cooperations among China and the Central and Eastern European (CEE)countries have attracted great attention, and which has become the focus of attention to achieve coordinated trade development among China and the CEE countries. The article introduces the current trade situation among China and CEE countries, and reveals that the overall trade situation between the both sides is great. From the perspective of trade complementarity, through the trade integration index and trade complementarity index, it is concluded that there is great potential for the development of trade relations among China and the CEE countries, and there is a certain degree of complementarity in trade exchanges, and suggests some proposals.

Keywords: China; Central and Eastern Europe; Trade Complementarity.

1. Introduction

With the gradual progress of China's "the Belt and Road" strategy and the proposal of "17+1 cooperation", China's economic and trade cooperations with CEE countries have become increasingly close. China is the world's largest developing country, and the 17 CEE countries are concentrated in emerging markets in Europe at a critical period of economic development. As an important region in China's "the Belt and Road" strategy, the 17 CEE countries have obvious regional advantages, and have comparative advantages in talent, technology and labor costs. With strong trade complementarity, they are "high-quality portals" for Chinese enterprises to open the European market. Both sides carry out economic and trade cooperations, with a focus on strengthening infrastructure construction and production capacity cooperation projects, and jointly establish a new type of partnership that transcends geographical differences and political games, achieving openness, inclusiveness, mutual benefit, and win-win results.

2. Analysis of Trade Complementarity among China and the CEE Countries

Table 1. Import and Export Trade Volume between China and Central and Eastern European Countries (USD 10000)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Greece	402102	364996	453108	394017	448894	524500	706136	1639143	781048	1215287
Albania	48677	56489	56915	55920	63535	65298	64768	136392	65235	75611
Bulgaria	189502	208158	216752	179210	164641	213657	258665	535306	291807	411076
Hungary	806110	840896	902423	807291	888999	1014539	1087736	2029366	116862	1571198
Poland	1438405	1481626	1719467	1708190	1764793	2134320	2451526	5501930	3105118	4211970
Romania	377692	403064	475199	446323	490562	560316	667056	1360472	776481	1021575
Estonia	136952	130986	137185	118909	117624	124996	127633	240642	114528	129137
Latvia	138154	147327	146402	116785	119503	132587	137975	251818	125273	138546
Lithuania	172104	181073	181506	134707	145587	185625	209281	417941	259522	262928
Slovenia	182268	213642	232346	238113	270812	338780	501464	772697	396088	599521
Croatia	137449	149477	112789	109838	117924	133987	153899	301273	170433	231682
Czech Republic	873043	945036	1098082	1100817	1101418	1248913	1630484	3494217	1887123	2116142
Slovakia	607827	653830	620547	503227	527125	531728	777804	1768746	946263	1209254
Former South Macedonia	22762	17158	16717	22114	13697	16449	15610	55640	38393	59022
Bosnia and Herzegovina	7001	11226	32143	11527	10771	13595	18713	37753	19279	27459
Serbia	51449	61173	53733	54899	59541	75925	95253	273553	212252	322569
Montenegro	16694	10255	21136	15855	14097	19898	21991	30935	17055	10746

Data source: UN Comtrade database

In recent years, the trade among China and the CEE countries has become increasingly frequent. According to statistics, China's import and export trade with CEE countries have increased from $54.36 billion in 2012 to $124.02 billion in 2021, with an average annual growth rate of 11.9%, far exceeding China's average annual growth rate

of 5.1% in global trade during the same period and the average annual growth rate of 5.0% in CEE countries. As shown in Table 1, the import and export trade volume among the 16 CEE countries and China have increased year by year. But since 2020, the global economy has declined due to the COVID-19, and the trade volume among China and the CEE countries have also declined to a certain extent. In addition, there is an overall upward trend. It is expected to maintain a stable development trend for a long time in the future.

CEE countries are in a critical period of transition from new economies to developed countries, facing the need for economic structural optimization and upgrading of domestic infrastructure construction. China has certain advantages in infrastructure and equipment manufacturing; In addition, the construction of new energy in CEE countries is relatively late and slow. China has mastered key research and development technologies in clean new energy such as hydropower, solar power generation, nuclear power, and wind power, and the two sides have strong trade complementarity; CEE countries have obvious advantages in specialty products, such as amber from Poland and crystal glass from the Czech Republic. The following is a complementary analysis of trade exchanges among China and the CEE countries from the perspective of trade integration and trade complementarity.

(1) Trade integration

The Trade Integration Index is a comprehensive indicator that measures the degree of trade dependence between two countries or regions. It is an important trade indicator proposed by the School of Economics, A.J. Brown, and improved by Japanese economists such as Kojima Kiyoshi. The calculation formula is as follows.

$$TII_{ij}^{t} = \frac{X_{ij}^{t} / X_{i}^{t}}{M_{j}^{t} / M_{w}^{t}}$$

X_{ij}^{t} represents the total export volume of country i to country j during period t, X_{i}^{t} represents the total export volume of country i during period t, M_{j}^{t} represents the total import volume of country j during period t, and M_{w}^{t} represents the total global import volume during period t. If TII_{ij}^{t} <1, it represents a relatively loose trade relationship between i and j; If>1, it means that the trade relationship between i and j is relatively close. The following is the trade integration index among China and the CEE countries.

Table 2. Trade Integration Index between China and CEE Countries

Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Hungary	0.19	0.18	0.2	0.2	0.2	0.2	0.22	0.25	0.29	0.3
poland	0.1	0.1	0.1	0.13	0.11	0.18	0.19	0.21	0.23	0.29
Czech Republic	0.12	0.12	0.12	0.13	0.12	0.12	0.15	0.17	0.19	0.21
Croatia	0.04	0.06	0.05	0.06	0.29	0.35	0.62	0.75	0.79	0.82
Macedonia	0.42	0.24	0.19	0.22	0.44	0.44	0.35	0.31	0.45	0.56
Serbia	0.02	0.01	0.01	0.02	0.1	0.13	0.16	0.17	0.19	0.23
Albania	0.26	0.45	0.54	0.53	0.6	0.61	0.62	0.66	0.68	0.72
Bosnia and Herzegovina	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.04	0.06	0.08
Romania	0.1	0.1	0.11	0.12	0.13	0.14	0.14	0.15	0.17	0.19
Bulgaria	0.31	0.29	0.25	0.32	0.26	0.27	0.33	0.44	0.52	0.56
Slovakia	0.22	0.24	0.21	0.21	0.26	0.27	0.22	0.23	0.25	0.29
Slovenia	0.08	0.06	0.06	0.06	0.07	0.07	0.09	0.13	0.16	0.18
Estonia	0.08	0.09	0.12	0.12	0.14	0.14	0.15	0.19	0.24	0.26
Latvia	0.06	0.09	0.11	0.12	0.12	0.13	0.2	0.24	0.31	0.32
Lithuania	0.03	0.04	0.04	0.05	0.05	0.05	0.06	0.09	0.1	0.11
Montenegro	0.01	0.02	0.04	0.05	0.06	0.08	0.08	0.09	0.1	0.12
Greece	0.1	0.12	0.14	0.16	0.18	0.19	0.19	0.2	0.21	0.22

Data source: Calculated based on UN Comtrade database

From Table 2, it can be seen that the trade integration index among CEE countries and China is less than 1, with low trade relations and relatively loose trade connections. Among them, the trade integration index between Hungary, Slovakia, Bulgaria, Poland and China is between 0.1 and 0.4. However, the trade integration indexes between the two sides show a significant upward trend, and under the promotion of the "17+1 cooperation" model, both sides will have great development potential in the future.

(2) Trade complementarity

The Trade Complementarity Index is a comprehensive indicator of trade complementarity between two countries, proposed by Petet Drysdale in 1967. The calculation formula is as follows.

$$C_{b}^{a} = \sum_{k} C_{ab}^{k} \frac{W_{k}}{W} = \sum_{k} RCA_{xa}^{k} RCA_{mb}^{k} \frac{W_{k}}{W}$$

Among them, $C_{ab}^{k} = RCA_{xa}^{k} . RCA_{mb}^{k}$ refers to the trade complementarity index of a single product k between country a and country b; W_{k} represents the total world exports of a single product k, W represents the total world exports of all products; C_{ab}^{k} represents the trade complementarity index

between country a and country b on a single product k, C_b^a represents the weighted average of all products, and which is the comprehensive trade complementarity index between country a and country b. In addition, RCA_{xa}^k represents to measure the indicative comparative advantage index of country a on a single product k by exports; RCA_{mb}^k represents to measure comparative disadvantage index on a single product k by imports. The specific formula is as follows.

$$RCA_{xa}^k = (X_a^k / X_a) / (W_k / W)$$

$$RCA_{mb}^k = (M_b^k / M_b) / (W_k / W)$$

Among them, X_a^k and W_k respectively represent the total exports among country a and the world on a single product k, while X_a and W respectively represent the total exports of all products of country a and the world; M_b^k represents the import amount of a single product k in country b, and M_b represents the total import amount of all products in country b. It is obvious that the larger the value of RCA_{xa}^k RCA_{mb}^k, the greater the indicative comparative advantage index of a (b) country on a single product k. If the value of C_{ab}^k is higher, it indicates that the trade complementarity between the two parties is stronger, and it is more advantageous for them to engage in complementary trade. The following is the trade complementarity index among China and the CEE countries.

(According to the Fourth Revision of the International Trade Standard Classification (SITC) (SICT, Rve. 4), divided into 10 categories, namely SITC0- Food and Live Animals, SITC1- Beverages and Tobacco, SITC2- Non edible Raw Materials, SITC3- Mineral Fuels and Related Materials, SITC4- Animal and Vegetable Oils, Oils and Waxes, SITC5- Chemicals and Related Products, SITC6- Manufactured Products Mainly Classified by Materials, SITC7- Machinery and Transportation Equipment, SITC8- Miscellaneous Products, SITC9- Classified Commodities)

Table 3. Trade Complementarity Index between China and CEE Countries

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
SITC0	0.47	0.49	0.51	0.52	0.54	0.55	0.57	0.58	0.59	0.63	0.65	0.66
SITC1	0.15	0.17	0.16	0.18	0.2	0.19	0.23	0.25	0.28	0.27	0.29	0.31
SITC2	0.13	0.13	0.11	0.14	0.12	0.15	0.17	0.19	0.21	0.23	0.28	0.3
SITC3	0.12	0.17	0.14	0.16	0.15	0.17	0.19	0.18	0.23	0.26	0.29	0.33
SITC4	0.03	0.03	0.02	0.04	0.03	0.05	0.07	0.09	0.12	0.16	0.18	0.19
SITC5	0.52	0.57	0.56	0.5	0.55	0.56	0.59	0.62	0.65	0.68	0.73	0.75
SITC6	1.53	1.52	1.53	1.52	1.54	1.56	1.59	1.62	1.65	1.67	1.69	1.72
SITC7	1.49	1.32	1.45	1.61	1.65	1.67	1.69	1.71	1.76	1.79	1.82	1.84
SITC8	1.79	1.67	1.89	1.71	1.83	1.9	1.92	1.93	1.96	1.97	2.01	2.05
SITC9	0.03	0.01	0.03	0.03	0.04	0.03	0.05	0.07	0.08	0.08	0.09	0.12

Data source: Calculated based on UN Comtrade database.

From Table 3, it can be clearly seen that the trade complementarity index of products in categories 1-5 and 9 is less than 1, which indicates weak trade complementarity among China and the CEE countries in these products. Among products in categories 6-8, the trade complementarity index is greater than 1, indicating strong trade complementarity among China and the CEE countries in these products. From the perspective of product types, China and the CEE countries have weak trade complementarity in primary products, while they have strong trade complementarity in technology and capital-intensive products such as manufactured goods and mechanical equipment. From the overall complementarity index, the growth momentum is obvious and the performance is stable, indicating that the trade between the two sides is in a stable development state.

3. Conclusion and Suggestions

This article analyzes from the perspective of trade complementarity. The trade integration index and trade complementarity index among China and the CEE countries are calculated, and the conclusion is drawn that the trade dependence among China and the CEE countries is not high, but there is great room for development; Trade complementary products are mainly concentrated in capital and technology intensive products such as industrial manufactured goods and mechanical equipment. Based on the above analysis, the following suggestions can be taken. (1) Trade imbalance needs to improve and the depth and breadth of mutual trade cooperation need to enhance. Overall, it is necessary to strengthen the import of characteristic products from CEE countries and encourage the government to implement favorable import measures. (2) The problem of a single trade structure in goods among China and the CEE countries has existed for a long time, and it seriously restricts the upgrading of the trade scale between both sides. To achieve optimization of the trade structure, it is necessary to expand the trade field. Both sides must firstly base on the advantages of their own products, take advantage of the complementary trade characteristics of their goods, and strengthen cooperation in multiple fields. (3) CEE countries, as the main constituent countries of emerging markets, are constrained by factors such as the size of their economies and the lack of key technological capabilities, resulting in outdated logistics, communication and other infrastructure. China should take advantage of this opportunity to help CEE countries strengthen cooperation in infrastructure construction, achieve connectivity, and deepen bilateral trade.

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