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The Docking Between China's "Belt & Road" and Russia's "TETEB"

Lijun Jia[1], Zhiwen Luo[1, *], Siyi Li[2]

[1]SHU-UTS SILC Business School, Shanghai University, Jiading, Shanghai, P.R. China
[2]Industrial Bank Co., Ltd, Jingan Shanghai, P.R. China

Abstract

Because of similar geographical location and common development vision, China's "Belt & Road" and Russia's "Transcontinental Eurasian Transport-Economic Belt" (TETEB) have possibility of common development in many industries. Based on the global value chain analysis framework, we firstly uses the Trade in Value Added (TiVA) database to calculate the global value chain (GVC) participation index and position index of different industries in China and Russia, and innovatively analyzes the docking industry between two belts to find the corresponding docking mode and the path for each industry. We find that the GVC participation is relatively similar in most industries of China and Russia, and the participation index values are relatively high; China has the lower GVC status index in some industries than Russia. It will start from quantitative analysis about the division of labor of various industries of China and Russia in the global value chain, so that the docking industry can be identified.

Keywords

Global Value Chain, GVC Index, Docking Areas, Docking Modes

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1. Introduction

Since the international financial crisis, the world economy is still not out of haze. As far as China, its economic growth range has been transferred from high-speed to medium or high-speed, that is the "new normal"; While Russia is facing the economic sanctions from United States and Europe, lower international oil prices, the devaluation of ruble, low economic growth and other types of complex difficulties. Thus it is the realistic choice for China and Russia to promote the economic development through of docking bilateral strategic which is "Belt & Road" proposed by Chinese government and "Transcontinental Eurasian Transport-economic Belts" planned by the Russian government. Because of similar geographic location and common development vision between two belts, there are possibility and feasibility of common development in many areas. Since 2013, China and Russia have signed nearly 100 cooperation documents, which covering petroleum, natural gas, coal, nuclear and other energy fields, aerospace, shipbuilding, Internet and other high-tech sector, trade, finance, infrastructure, agriculture, environmental protection and cultural exchange etc. Industrial docking of two belts can not only promote the Eurasian Economic Integration, the construction of the Eurasian common economic space, but also have an important impact on the world economic map and even the formation of new global political and economic order.

At present, there are a number of scholars who have illustrated the docking area and the implementation path of two belts in

* Corresponding author
E-mail address: 602393285@qq.com (Zhiwen Luo)

detail. However, this kind of literature in favor of the qualitative description, there is not a large number of industry data as a support. Therefore, this paper creatively use the method of global value chain and the data to analyze the status of division of labor and the degree of participation and further to identify docking areas and find docking modes.

Based on this, this paper will review the relevant issues in the second part. The third part introduces the analysis framework and research methods; In the fourth part of the empirical research, this paper uses the GVC index construction method, selects the added value data of the 18 industries of China and Russia in the TiVA database, measures respectively GVC participation index and status index of different industries in China and Russia, further analyzes the field identification when two belts are docking; According to the measurement result, in the fifth part, using coordinate recognition method, the authors placed the GVC index value of each industry in China and Russia in a coordinate system to analyze the complementarities of docking industries between two belts, further to look for an effective path for the docking.

In September 2013, President of China Jinping Xi proposed to build "Belt & Road", which attracted the attention of many scholars, they have made a lot of discussions on various issues, such as its connotation and the causes of formation, spatial range, the status of domestic cities along the line and so on.

Along with the propose of "Belt & Road" and the study of relative basic problems, scholars have become more and more profound understanding of the development strategy, many new problems have been put forward, for example, the theoretical basis of the construction of the "Belt & Road", costs and benefits, risks faced, the partnership with several Central Asian countries and Russia, the United States, Japan.

About the problem of cooperation with other countries, in general, the existing literature review mainly in three aspects: the first one is the possibility and the current situation of the economic cooperation in various countries along the "Silk Road". In this regard, the scholars use data of the level of economic growth, the total trade volume and commodity structure to study the complementarities from different perspective; The second one is whether they have a cross regional cooperation required for public goods; The third one is about the content of cooperation, some scholars emphasize on achieving cooperative consensus and establish cooperation mechanism between all parties.

Based on the research of previous scholars, this paper believe that it is particularly important to how to cooperate between big countries along the belt, especially how to dock with Russia which is an important power in the strategies of Central Asia and attract the active participation of Russia. The connectivity between the "Silk Road" of China and "Transcontinental Eurasian Transport-Economic Belts" of Russia is an effective measure.

In summary, the literatures stay at the qualitative analysis level. In the background of the division of labor of global value chain, it needs a lot of industry data as a support to measure the status of division of labor and the degree of participation when different industries in China and Russia participate in the global value chain, can identify potential industrial areas of the docking development strategy in two countries. This paper intends to use the constructed GVC index, with the help of TiVA data jointly issued by OECD and WTO to calculate the status of division of labor in the global value chain of different industries between China and Russia, so as to more accurately identify the docking areas of two belts.

2. Research Methods and Data Sources

At present, the global value chain is the main feature of the world economy and the main performance of the global diversified production which is driven by technological progress, cost, resources and market access, reform of trade policy and other factors. When studying the status of the international division of labor of a country's industry, using the theory of global value chain can solve three problems in the traditional full trade statistics: The first one is the traditional full value trade statistics exaggerated the importance of trade; Secondly, the traditional full value trade statistics did not distinguish the source of the value added in the trade. So it is difficult to estimate the contribution of the country's competitiveness. Thirdly, it makes the lack of effective measures of intangible assets, including the related technology, patents, trademarks, copyrights, resulting in the distortion of trade's contribution to the economy.

The concept closely related with the global value chain is value added trade, so the measure of value added trade is the basis for analyzing other problems in the global value chain.

2.1. Value Added Trade

Value added is the new value created through the effective labor in the process of production based on the original value of the product. In international trade, value added usually refers to a product that gets a new value due to labor compensation, customs duties or profit. The international trade data statistics method based on the value added is called statistical method of value added.

For example, if the country A exports 100 dollars of goods to country B. After processing these goods, country B exports them to country C, at 110 dollars. According to the traditional

trade statistics, country B has a trade surplus of $110 to country C, while there is not a trade between country A and country C. However, in accordance with the trade statistics of the added value, country B only has a trade surplus of $10 to country C, while country A has a trade surplus of $100 to country C (Detail in Figure 1).

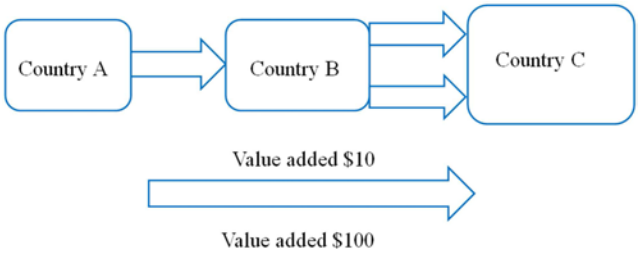

Figure 1. Trade surplus between countries A, B, C.

Thus, statistical method of value added solves the problem of repeated calculation of intermediate products and services, so as to better identify the real contribution of the country's exports to its economic welfare.

2.2. Decomposition of Value Added

Koopman, Powers, Wang and Wei (KPWW) further put forward the integration between statistical method of value added in the national accounts accounting system and the traditional customs clearance statistics (or full value statistics) in 2010, by building a global multi-sectoral input-output database to put the domestic value added statistics from a single country expand to the region and even the world, to estimate domestic and oversea value added trade in a country's trade in all aspects. KPWW method divides a country's total exports for the domestic value-added and abroad value-added. According to the final products or intermediate products, the domestic value added further is divided into four parts, including the final products and services directly to the importers' consumption, the intermediate products needed by importers to produce the goods demanded by domestic country, the intermediate products needed by importers to produce the goods demanded by the third country, the intermediate products needed by importers to produce the goods required by the country (Detail in Table 1).

Table 1. The decomposition of value added in total exports.

Total Exports				
Domestic Value Added				
The final products and services directly to the importers' consumption (Direct value added) I	Performance as an intermediate products exports			Foreign value added V
	Be used to produce the goods demanded by domestic country by importers (Direct value added) II	Be used to produce the goods demanded by the third country by importers (Indirect value added) III	Be used to produce the goods required by the country by importers (Re-import) IV	

Note: according to Koopman etc (2010)

2.3. The GVC Index

Based on the decomposition of total exports, Koopman (2010) constructed the GVC participation index and the GVC status index that reflects the degree that a country's participation in the global value chain and the status of the international division of labor.

GVC participation index is defined as the proportion of the sum of indirect value added exports in a country (i.e. III in table 1) and foreign value added exports (i.e. V in table 1) with total exports. The calculation formula is as follows:

$$GVC\ Participation_{ir} = \frac{IV_{ir}+FV_{ir}}{E_{ir}} \quad (1)$$

This formula shows the participating degree of industries in country r in the global value chain and 、respectively show the indirect domestic value added and foreign value added of a country's total exports, and accounting total exports by value added. The formula is a measure of a country's forward participation, that is, the applied degree of the intermediate products in the subsequent production process of other countries. However, measures a country's backward participation, which is the degree that the country uses intermediate products of other countries to conduct the production of the subsequent link. The participant index of global value chain can accurately describe the depth of a country's participation in the international division along the industrial value chain. If a country's GVC participant index is higher, the trade share of pure intermediate goods of the country's export value is greater, the degree of the country's participation in the division of global value chain is deeper, and the function of cohesion in the formation process of the global value chain is greater.

GVC status index is defined as the gap between a country's indirect values added exports and foreign value added exports. If the ratio of indirect value added exports in a country's total export is higher than the ratio of foreign value added exports, it means that the country can provide intermediate products for the rest of the world, indicating that the country is in the upstream link, whereas, it is in the downstream link. The calculation formula is as follows:

$$GVC\ Position_{ir} = \ln(1+\frac{IV_{ir}}{E_{ir}}) - \ln(1+\frac{FV_{ir}}{E_{ir}}) \quad (2)$$

It shows the status of division of i industry of country r in the global value chain. If country r is in the upstream link of the

global value chain, it exports more intermediate products and imports less intermediate products, the value of GVC status index is greater; If country r is in the downstream link of the global value chain, mainly engaged in the production and processing of the final assembly link, it imports more intermediate products, exports less intermediate goods, the value of GVC status index refers to the smaller.

2.4. Data Selection and Description

This article will use the TiVA database which is newly released by OECD-WTO in October 2015. Based on the input-output table of OECD, in this database, the total exports is divided into foreign value added and domestic value added, and here the domestic value added is divided into domestic industrial direct value added, domestic indirect value added (from the parts of domestic production) and the domestic value-added of re-import. The basic framework of the TiVA database is formed by calculating the data of various industry in various countries to obtain their value added of trade, The database includes 34 OECD members and 27 non-members including BRICS, involves 18 main industries of manufacturing and service industry, covering 7 years from 1995 to 2011. According to the purpose of this paper, the authors will select data of 7 years of 18 main industries in China and Russia as the basic numbers of the calculation of GVC index values. If necessary, we will continue to select TiVA data of the subdivision industries under the main industries. TiVA database plays an important role in the study of the status of division of labor in the global value chain of different industries in a country.

For the selection of industry, based on the industrial classification of TiVA database, this paper selects four categories: agriculture, mining industry, manufacturing industry and service industry. Here, the agriculture industry includes agriculture, forestry, animal husbandry and fishery; Mining industry includes mining and quarrying; Manufacturing industry includes food, beverage, tobacco, textile, leather, footwear, wood, paper, print, chemical engineering, non-metallic mineral products and base metals and metal products, machinery and equipment manufacturing, electronic and optical equipment, transportation equipment, other manufacturing and recycling, the supply of electric power, water, gas and building. Service industry includes wholesale and retail and hotel catering, transportation, warehousing, post and telecommunications, financial intermediaries, real estate leasing and business, community, social and personal services.

To sum up, this paper selects domestic indirect value added, foreign value added and gross export value of 7 years from 1995 to 2011 of 18 main industries in China and Russia as the basic numbers of the calculation of GVC index values. In addition, in order to further discuss the contribution of the subdivision industries under the main industries to the degree of GVC participation and status of the industry, the authors also pursue domestic indirect value added, foreign value added, gross export value and other parameters of its subdivision industries.

3. Empirical Analysis

3.1. The Degree of GVC Participation in Different Industries Between China and Russia

This section is mainly to discuss the degree that different industries in China and Russia participate in the division of labor of the global value chain. Based on the formula 1, the authors calculate GVC participation index of each industry in China and Russia in different years (as shown in Table 2).

Table 2. GVC participation index of different industries in China and Russia.

Industry	China						
	1995	2000	2005	2008	2009	2010	2011
Agriculture	0.366	0.378	0.383	0.384	0.386	0.375	0.392
Mining and quarrying	0.532	0.454	0.523	0.532	0.537	0.531	0.547
Food, beverage and tobacco	0.659	0.676	0.696	0.747	0.761	0.767	0.773
Textile, leather and footwear	0.778	0.702	0.718	0.754	0.761	0.755	0.762
Wood, paper, printing and publishing	0.726	0.745	0.735	0.762	0.764	0.76	0.77
Chemical and non-metallic mineral products	0.709	0.726	0.749	0.777	0.78	0.778	0.782
Base metal and metal products	0.701	0.76	0.745	0.759	0.765	0.761	0.766
Machinery and equipment manufacturing	0.698	0.701	0.722	0.73	0.738	0.731	0.733
Electronic and optical equipment	0.751	0.804	0.82	0.806	0.812	0.81	0.807
Transport equipment	0.716	0.716	0.733	0.735	0.722	0.689	0.694
Other manufacturing and recycling	0.787	0.685	0.705	0.673	0.745	0.742	0.745
The supply of gas, electricity and water	0.475	0.533	0.520	0.600	0.601	0.62	0.628
Construction	0.708	0.73	0.696	0.653	0.649	0.666	0.665
Wholesale and retail and hotel catering	0.432	0.519	0.318	0.380	0.366	0.35	0.346
Transportation, warehousing and post and telecommunications	0.364	0.403	0.497	0.461	0.456	0.452	0.451
Financial intermediaries	0.262	0.212	0.339	0.264	0.267	0.275	0.274
Real estate leasing and business	0.379	0.43	0.526	0.573	0.611	0.64	0.645
Community, social and personal services	0.563	0.579	0.508	0.504	0.503	0.507	0.507

	Russia						
Industry	1995	2000	2005	2008	2009	2010	2011
Agriculture	0.38	0.329	0.359	0.387	0.392	0.430	0.38
Mining and quarrying	0.408	0.507	0.333	0.299	0.333	0.307	0.283
Food, beverage and tobacco	0.675	0.663	0.646	0.654	0.637	0.670	0.666
Textile, leather and footwear	0.63	0.662	0.662	0.563	0.578	0.665	0.647
Wood, paper, printing and publishing	0.579	0.533	0.57	0.599	0.598	0.614	0.616
Chemical and non-metallic mineral products	0.611	0.572	0.583	0.618	0.658	0.679	0.629
Base metal and metal products	0.57	0.625	0.653	0.685	0.715	0.708	0.740
Machinery and equipment manufacturing	0.519	0.526	0.613	0.624	0.635	0.647	0.637
Electronic and optical equipment	0.57	0.561	0.615	0.622	0.625	0.630	0.617
Transport equipment	0.62	0.582	0.731	0.752	0.729	0.688	0.708
Other manufacturing and recycling	0.572	0.523	0.648	0.672	0.628	0.647	0.662
The supply of gas, electricity and water	0.559	0.501	0.61	0.635	0.585	0.622	0.612
Construction	0.486	0.496	0.478	0.473	0.460	0.456	0.468
Wholesale and retail and hotel catering	0.249	0.228	0.313	0.311	0.335	0.325	0.327
Transportation, warehousing and post and telecommunications	0.31	0.375	0.413	0.437	0.446	0.442	0.479
Financial intermediaries	0.206	0.254	0.227	0.236	0.212	0.223	0.242
Real estate leasing and business	0.215	0.273	0.211	0.236	0.237	0.335	0.283
Community, social and personal services	0.5	0.511	0.426	0.431	0.422	0.432	0.425

Note: calculating by the data of the trade (TiVA) of value added database in OECD-WTO

On the whole, according to table 2, the trade shares of intermediate goods of more than half of China's industry accounts for large in the gross export value, that is to say, the degree of participation in the global value chain is very deep, and the degree of dependence on the world market is also strong. These industries including the electronic and optical devices, chemical and non-metallic mineral products, base metals and metal products, wood, paper, printing and publishing, textile and leather shoe, tobacco, food and beverage, machinery and equipment manufacturing, transportation equipment and other manufacturing, recycling and construction. In other industries, real estate leasing and business, the supply of electric power, water, gas and mining, quarrying, community, social and personal services and transportation and warehousing and post, telecommunications communication are medium in the degree of GVC participation, the degree of GVC participation of agriculture, forestry, animal husbandry and fishery, wholesale and retail and hotel catering and financial intermediaries are relatively low. The degree of GVC participation of real estate leasing and business increase from 0.379 in 1995 to 0.645 in 2011, an increase of nearly 70.2%, this industry is mainly composed of real estate, machinery and equipment leasing, electronic commerce and development and other business activities, and the development of machinery equipment leasing industry led to the rise of GVC participant index in the whole industry. In the end of 90s, vendor leasing in China sprang up, while its government and enterprises are stepping up the construction of information. Thus some famous multinational companies and international leasing company to enter China and set up a new type of leasing company with domestic enterprises, for example, by jointing ventures with domestic enterprises, Chinese Hewlett-Packard Co. sets up HP leasing companies to introduce the financial services and leasing marketing system to China, thus to strengthen the leasing consciousness. So Chinese leasing industry continues extends into the global value chain. However, the wholesale, retail and hotel catering industry are worthy of attention in 18 industries. Their GVC participation index fell sharply from 0.519 to 0.318 in 2000. Although there is a slow rebound after 2005, the degree of participation is still low, by 2011, its GVC participation index is only 0.346, belongs to the lower level.

For Russia, the degree of GVC participation of its transportation equipment, base metals and metal products, other manufacturing and recycling, food, beverage and tobacco, the supply of electric power, gas and water, electronic and optical devices, chemical and non-metallic mineral products, wood, paper, printing and publishing, textile, leather, footwear, machinery and equipment manufacturing industry are high, and many industries have had a rapid increase since 2000. The degree of participation in global value chain of transportation equipment industry was the deepest in Russia in 2008. In contrast, the degree of GVC participation of construction, transportation and warehousing and telecommunications, community, social and personal services were in the middle level, but the transportation, warehousing, postal and telecommunication industry between 1995 and 2011 have been steadily rising trend; Agriculture, forestry, animal husbandry and fishery, mining and quarrying, wholesale and retail, hotel and catering industry, financial intermediaries and the real estate leasing and business have a relatively low degree of GVC participation. Above all, more than half of the industry in Russia have the very strong participation in the global market, and play an indispensable cohesive role in the formation of the global value chain.

In order to compare the degree of GVC participation of the same industry in China and Russia, this paper find out the average value of GVC participation index of different

industries in two countries in different years (Figure 2) and compare them.

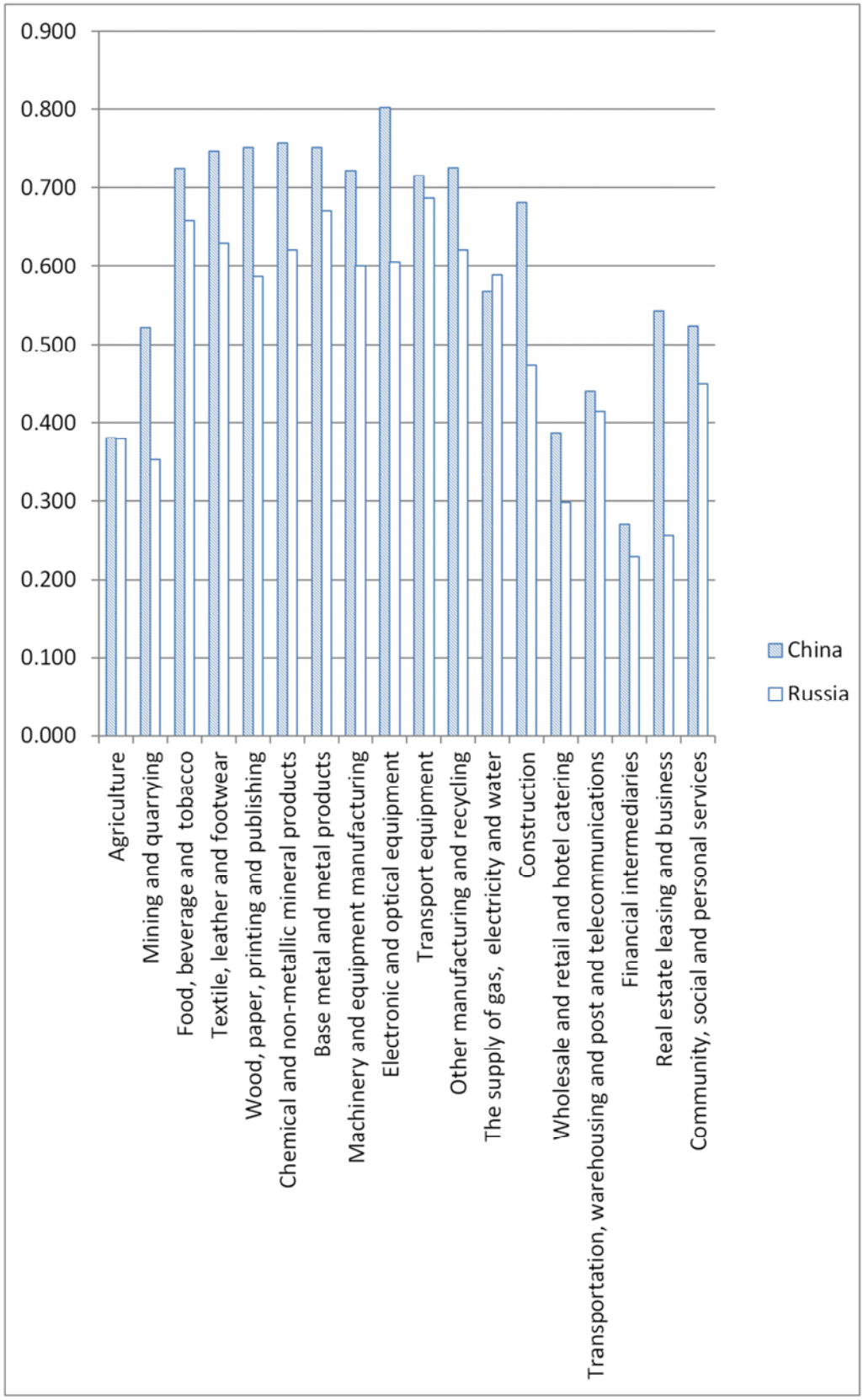

Figure 2. The average value of GVC participation index of different industries in China and Russia.

Note: calculating by the data of the trade (TiVA) of value added database in OECD-WTO and the data of Table 2

From figure 2, the GVC participant index of food and beverage, tobacco, textile leather footwear, wood, paper, printing and publishing, chemical industry, non-metallic mineral products, base metals and metal products, machinery and equipment manufacturing, electronic and optical equipment, transportation equipment and other manufacturing, recycling, energy and water supply industry in China and Russia are all very high, and their value are more than 0.5, which indicated the degree of this kind of industry's participation in the global value chain was very deep and played an important role in the world market. In contrast, there is also part of industries in China and Russia which are not involved deeply in the global market to participate in the international division of labor, these industries include agriculture, forestry, animal husbandry and fishery, wholesale, retail and hotel catering, transportation, storage, post and telecommunications and financial intermediaries, and their GVC participant index are less than 0.5. However, the index of financial intermediaries is even lower which is below 0.3 in China and Russia.

Comparing between China and Russia, in addition to the supply of electricity, gas and water, the GVC participation index of other 17 industries in China are higher than in Russia, and the GVC participant index of mining and quarrying, construction, real estate leasing and business are significantly more than Russia.

3.2. Empirical Results of the Status of GVC Division of Labor of Different Industries in China and Russia

This section mainly analyses the status of different industries' participation in the GVC in China and Russia. Base on the formula 2, the author will to calculate this index according TiVA data of different industries in China and Russia (see Table 3).

Table 3. The status index of subdivision industries' participation in the GVC division of labor in China and Russia.

Industry	China						
	1995	2000	2005	2008	2009	2010	2011
Agriculture	0.192	0.188	0.153	0.157	0.179	0.151	0.159
Mining and quarrying	-0.133	-0.123	-0.007	0.038	0.069	0.039	0.018
Food, beverage and tobacco	-0.086	-0.018	0.147	0.215	0.242	0.202	0.193
Textile, leather and footwear	-0.063	-0.046	0.073	0.18	0.204	0.165	0.169
Wood, paper, printing and publishing	-0.205	-0.203	-0.008	0.012	-0.001	-0.013	-0.051
Chemicaland non-metallic mineral products	-0.209	-0.2	-0.088	-0.014	0.031	0.001	-0.032
Base metal and metal products	0.01	-0.009	0.058	0.135	0.126	0.105	0.084
Machinery and equipment manufacturing	-0.077	-0.058	0.019	0.102	0.122	0.102	0.091
Electronic and optical equipment	-0.52	-0.511	-0.373	-0.211	-0.195	-0.199	-0.192
Transport equipment	-0.164	-0.1	-0.03	0.07	0.106	0.081	0.071
Other manufacturing and recycling	0.166	0.126	0.141	0.213	0.257	0.23	0.219
The supply of gas, electricity and water	0.319	0.329	0.291	0.331	0.346	0.339	0.34
Construction	0.443	0.432	0.351	0.313	0.336	0.328	0.32
Wholesale and retail and hotel catering	0.307	0.341	0.209	0.245	0.246	0.228	0.225
Transportation, warehousing and post and telecommunications	0.244	0.242	0.242	0.222	0.247	0.229	0.223
Financial intermediaries	0.2	0.156	0.22	0.176	0.185	0.183	0.181
Real estate leasing and business	0.26	0.255	0.26	0.271	0.314	0.305	0.306
Community, social and personal services	0.375	0.367	0.285	0.279	0.299	0.286	0.283
	Russia						
Industry	1995	2000	2005	2008	2009	2010	2011
Agriculture	0.147	0.107	0.122	0.133	0.133	0.136	0.121
Mining and quarrying	0.208	0.111	0.163	0.139	0.166	0.152	0.134
Food, beverage and tobacco	0.247	0.235	0.231	0.249	0.245	0.234	0.244
Textile, leather and footwear	0.075	0.148	0.154	0.113	0.113	0.11	0.089
Wood, paper, printing and publishing	0.183	0.089	0.148	0.17	0.181	0.184	0.17
Chemical and non-metallic mineral products	0.211	0.08	0.214	0.236	0.273	0.275	0.241
Base metal and metal products	0.212	0.128	0.227	0.193	0.229	0.219	0.208
Machineryand equipment manufacturing	0.107	0.071	0.074	0.041	0.096	0.087	0.052
Electronic and optical equipment	0.119	0.078	0.078	0.045	0.098	0.087	0.053
Transport equipment	0.122	0.072	0.085	0.049	0.107	0.089	0.055
Other manufacturing and recycling	0.213	0.182	0.223	0.217	0.195	0.2	0.197
The supply of gas, electricity and water	0.29	0.135	0.264	0.268	0.274	0.284	0.267
Construction	0.202	0.142	0.123	0.095	0.112	0.107	0.097
Wholesale and retail and hotel catering	0.117	0.076	0.124	0.122	0.145	0.134	0.127
Transportation, warehousing and post and telecommunications	0.114	0.089	0.134	0.131	0.169	0.158	0.155
Financial intermediaries	0.092	0.087	0.088	0.085	0.089	0.091	0.089
Real estate leasing and business	0.112	0.11	0.094	0.101	0.112	0.149	0.119
Community, social and personal services	0.208	0.207	0.19	0.194	0.194	0.196	0.184

Note: calculating by the data of the trade (TiVA) of value added database in OECD-WTO

According to table 3, in general, we can find that half of Chinese industries are in the downstream position of the global value chain during 1995-2000, they are mining and quarrying, food, beverage and tobacco, textile, leather and footwear, wood, paper, printing and publishing, based metals and non-metallic mineral products, chemical and metal products, machinery and equipment manufacturing, electronic and optical equipment and transportation equipment, and almost all of these industries belong to manufacturing categories, which shows that China played the role of "world factory" in the global production network in the early periods. After 2000, some industries such as food, beverage and tobacco, textile, leather and footwear, base metals and metal products, machinery and equipment manufacturing, have been slowly out of low-end position of the global value chain and begin to gradually enter the position of upstream division of labor. But these industries like wood, paper, printing and publishing, chemical and non-metallic mineral products and electronic and optical devices are still in the downstream position, especially the electronic and optical equipment industry. In contrast, Chinese service industries are all in the upstream position of the global value chain, and the status of GVC division of labor is higher in the industry of community, social and personal service.

Table 3 also shows that the status in the global value chain of almost all of the industries in Russia in 2000 has dropped to freezing point. In the author's opinion, this phenomenon may be due to the financial crisis of Russia in 1998. In the early 90s, Russia implemented economic reform to adjust its economic structure which put traditional military, energy and the production of raw materials as the main part. With minimal progress, energy and raw materials as well as large manufacturing enterprises are still the mainstay of the national economy, the foreign exchange earned by these industries is used for importing a large number of food and daily necessities. This economic structure resulted in the imbalance of governmental payment in 1998, in which year the energy market was stagnant and the price of raw material fell because of the Southeast Asian financial crisis. Thus the status of GVC division of labor of Russian industries in 2000 showed a very sluggish state. Apart from 2000, in other years, the status indexes of GVC of Russian 18 primary industries are all in the upstream position. The supply of electricity, gas, water, chemical and non-metallic mineral products, food, beverage and tobacco belong to the higher status of the international division of labor, their value of GVC status index basically maintained at above 0.2. In contrast, the industries such as transport equipment, electronic and optical equipment, machinery and equipment manufacturing in Russia are in the upstream position of the global value chain, but their values of GVC status index are relatively low than other industries and almost no more than 0.1 between 1995 and 2011. Thus, we can conclude that even if Russia as a whole was in the upstream position of the global production network, but not all industries were entirely in the high-end status of the production chain.

4. Field Identification and Model Selection of the Two Docking Belts

4.1. Field Identification of the Two Docking Belts

According to the measurement results of GVC participant index and status index of each industry in China and Russia, this paper uses the method of coordinate axis system to analyze the complementarities of docking industries between China and Russia and puts forward the docking mode of two belts. To be more intuitive to show the relationship of the status of GVC division of labor in same industry between China and Russia, Figure 3 views the average value of GVC status index of each industry in two countries as reference to establish the coordinate system, in which, the horizontal axis is the value of GVC status index of Chinese industry, the vertical axis is the value of GVC status index of Russian industry. The first quadrant shows the industries that the value of GVC status index of China and Russia are all in the upstream, the second quadrant shows the industries that the status of Chinese is in the downstream, while Russia's is in the upstream, the third quadrant shows the industries that the status China and Russia are all in the downstream, the fourth quadrant shows the industries that the status of Russian is in the downstream, but China's is in the upstream. In addition, in order to further compare the level of the status of GVC of each industry in China and Russia in the same quadrant, the authors made a straight line of 45 through the origin, upward side of the straight line represents higher status in Russian industry, and the downward side represents higher status in China industry.

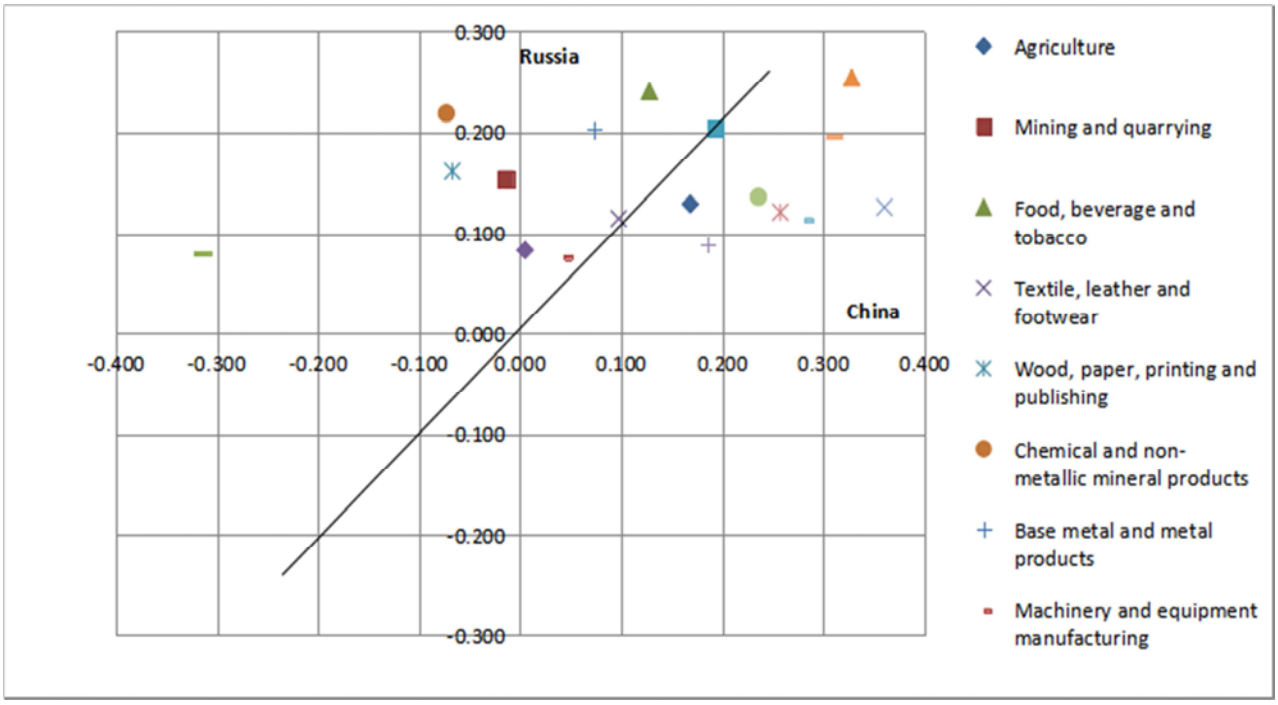

Figure 3. The relationship of the status of GVC division of labor in same industry between China and Russia.

Note: according to the average value of GVC status index of China and Russia in Table 3.

From Figure 3, we can find that the status index of GVC of Chinese and Russian industries are concentrated in the first and second quadrant, that is to say, to some industries, the two countries are both in the upstream, while to some other industries, China is in the downstream and Russia is in the upstream. Among that, the industries in the second quadrant are mining and quarrying, chemical and non-metallic mineral products, wood, paper, printing and publishing, electronic and optical devices.

In the first quadrant, the industries which locate at the upside of the 45 degrees straight are food, beverage tobacco, base metals and metal products, machinery and equipment manufacturing, textile, leather and footwear, other manufacturing, recycling and transportation equipment. These industries in China and Russia are in the upstream. But the GVC status of industries in Russia is relatively higher. Similarly, the industries which locate at the downside of the 45 degrees straight are agriculture, forestry, animal husbandry and fishing, transportation, warehousing, post and telecommunications, the supply of electricity, gas and water, construction, wholesale and retail, and hotel catering, financial intermediates, real estate leasing and business, community, social and personal services. These industries in China and Russia are in the upstream. But the GVC status of industries in China is relatively higher. For these two kinds of industry whose status of GVC in two countries are all high, while one of the country is higher than the other one, this paper believes that there is the possibility of docking.

From the figure 3, we can also find that there are four industries fall in the second quadrant, they are mining and quarrying, chemical industry and non-metallic mineral products, wood, paper, printing and publishing and electronic and optical devices, these industries are in the downstream position of China and are in the upstream position of Russia. For example, for the mining industry, China's GVC status index is -0.014, while Russia is 0.153. Consequently, it indicates that Chinese mining and quarrying industry is in the downstream position of the global value chain which imports and process more intermediate goods. With the rapid development of Chinese economy, the demand for resources continues to rise, thus its mineral resources are faced with a very serious contradiction between supply and demand. And the shortage of resources has become increasingly prominent. In contrast, Russia is a country with extremely abundant mineral resources. There are abundant mineral resources in the Far East and Siberia area. Because of the lack of human resources, Siberia area and the Far East with abundant mineral resources can’t be effective developed and utilized. Up to January 2014, the population of Siberia area is only about 7.647 million people which only occupy 5.3% of the total population of the country. Meanwhile, the trend of natural reduction of population has not been effectively curbed. Therefore, if the two countries can achieve complementarities of resources, that is, mineral resources and human resources complement each other, it will be beneficial for China and Far East and Siberia region of Russia.

4.2. Model Selection of the Two Docking Belts

In this section, the authors drew figure 4 to analyze the docking mode based on the viewpoints of Kolinsky and Readman (2002). They believe that there are two modes when developing countries carry out the transformation and upgrading of traditional enterprises and dock with global economy: "Low road" mode and the "high road" mode. "High road" includes the transformation dock and upgrading dock. "Low road" includes the association dock and radiation dock. In order to match with the coordinate system of Figure 3, the docking mode is matched with each quadrant.

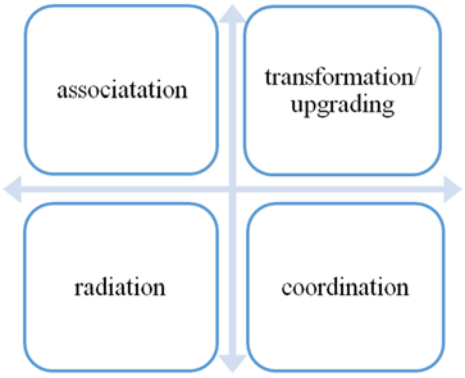

Figure 4. Concept map of docking mode.

Note: Draw it based on Kolinsky and Readman (2002)

High end matching is a thorough method，by which the industry with low status of GVC can enhance their competitiveness and achieve success docking with the high status through the innovation of technique skills, mechanism and management, eliminating or transferring the lagged production capacity. It is consisted of two specific paths, one is docking through transforming and the other is through upgrading.

Here, docking through transforming refers to the industries with low status becoming the main character in the new industry chain by breaking from the original traditional industrial chain and embedding into strategic emerging industries actively. According to the above analysis, the electricity and gas industry and the construction industry of Russia should match the corresponding industries in China by the path of transformation. Taking the electric power industry as an example, China is ahead of Russia in the fields of overall size, voltage level, UHV technology, the ability of allocating resources from the large area and the construction of smart grid. In the cooperation of docking between two belts, the Russian Power Grid Corp and the Chinese Power Grid Corp can sign a strategic cooperation agreement and can carry out long-term technical exchanges and mutually beneficial cooperation in the aspects of the research and application in smart grid, extra high voltage AC / DC, the construction of transmuting and distributing electivity, and the feasibility of the building Eurasian power bridge. In this way, it not only can promote the development of electric power industry in Russia, but also be beneficial to the surrounding countries along with the Silk Road.

The match in low end is a pattern of shallow docking. It refers that the industries of low GVC status realize the docking with the strategic emerging industries through becoming the supporting part of strategic emerging industries or making full use of the radiation effects of talents and technology. It is consisted of two specific paths, one is associated docking and the other is radiation docking. The associated docking means that industries with low GVC status are becoming the relative support of strategic emerging industries, through becoming their upstream and downstream industries, they undertake the role of providing the raw materials, spare parts and after-sales service for strategic emerging industries. And in the radiation docking, for the purpose of improving the competitiveness of traditional industries and implementing the success docking with the strategic emerging industries, the industries with low GVC status share the radiation effects from talents and technology with strategic emerging industries.

In conclusion, the electricity gas industry and construction industry can match through the transformation pattern. Russia breaks the traditional industrial chain by introducing new technology and eliminating the backward production capacity; for the industry of mechanical equipment and financial intermediaries, China and Russia enhance the function of technology research or the core competitiveness by upgrading docking. However mining and timber industry can be docked by the low end matching model, here China has own advantage of labor resources, which can provide the supporting downstream processing link for the industry docking.

5. Conclusions and Policy Recommendations

Based on the analysis framework of global value chain, this paper analyzes the current situation of participation in GVC of different industries in Russia and China by measuring the GVC participation degree using TiVA database, identifying docking areas, and finding out the mode and path of docking. Following are the main conclusions:

Firstly, the GVC participation is relatively similar in most industries of China and Russia, and the participation index values are relatively high. Only in these three industries of mining, construction and real estate leasing and business, the two countries have different GVC participation, and China's

GVC participation is significantly higher than Russia.

Secondly, from the data of GVC status index, China has the lower position in four industries, including mining and quarrying, wood paper printing and publishing, chemical and non-metallic mineral products industry, electronic and optical equipment industry. However, Russia is in the upstream position, so these fields of industry can be carried into docking at first. China and Russia are all in the upper reaches of the international division in remaining industries, but there is also a gap of GVC status index in the same industry between the two countries. So it still has the possibility of docking.

Finally, from the docking path, the gas industry and power construction industry in Russia can be docked through the transformation. By introducing high technology and eliminating the backward production capacity, it can break the traditional industry chain finally; China's aviation machinery and equipment and the financial intermediaries of Russia can be docked through upgrading, Improve the function of technology development or enhance the core competitiveness by the movements in the value chain; Mining and timber industry can be docked by relative link, China can provide the supporting downstream processing link for the industry docking because of labor resources.

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JEL classification: F13, F14

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