

Analysis of Influential Factors of China-korea Manufacturing Intra-industry Trade

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Abstract: Previous research shows that trade between China and South Korea is dominated by intra-industry trade, and trade in manufacturing products accounts for more than 92% of the trade volume between the two countries. This article analyzes the background, current situation and existing problems of China-Korea manufacturing intra-industry trade, and calculates the GL index representing the level of China-Korea manufacturing intra-industry trade from 2008 to 2017. Based on the theory, we selected South Korea's direct investment in China, the per capita income gap between China and South Korea, the level of Chinese manufacturing technology, the degree of openness of the Chinese and Korean markets, and economies of scale. The multiple linear regression models were used to analyze China and South Korea Influencing factors of intra-industry trade in manufacturing.

1. Introduction.

1.1 Research Background.

With the international situation became stable, there are two situations in the development of international trade: one is the inter-industry trade of product exchange activities between different industries; the other is the product exchange within the same industry, which is called intra-industry trade. Li Ke (2017) pointed out that intra-industry trade accounted for more than 90% of the North American Free Trade Area, and the proportion of trade in East Asia was as high as 70%, indicating that intra-industry trade has become a regional and global international trade development trend and growth point. ^[1] The United States is in the recovery stage of the economic crisis, the Japanese economy is in a downturn, and the European Union is suffering from the debt crisis. East Asia has become an active part of the global economy. At the 2019 National Import and Export Working Conference, the Ministry of Commerce proposed that the environment for China's foreign trade development is more complex and severe, there is greater uncertainty and more risks and challenges, and it is necessary to maintain a sober understanding. China and South Korea, as active economic entities in East Asia, have conducted trade activities since the establishment of diplomatic relations in 1992.

1.2 Research Significance.

China has abundant natural resources and labor resources. As one of the representatives of newly industrialized countries, South Korea has advanced technology. The differences in the respective advantages of the two countries have laid the foundation for economic cooperation between the two countries and provided a broad space for the development of intra-industry trade. The proportion of trade in manufacturing products between China and South Korea has always remained above 90%. It can be seen that the main trade between China and South Korea is manufacturing products. Therefore, studying it is of great significance to improve China's external trade circumstance, enhance China's manufacturing trade level, and enhance its international trade status. Meanwhile, the research on the intra-industry trade of China-Korea manufacturing industry provides an empirical analysis on that of developed and developing countries.

2. Related Theories on Intra-industry Trade.

2.1 Meaning of intra-industry trade

In terms of product production, international trade can be divided into two basic types: one is that the products imported and exported by the country belong to different industrial sectors, such as exporting labor-intensive products and importing capital-intensive products, which are called inter-industry trade; A kind of intra-industry product that is exported and imported at the same time is called intra-industry trade.^[7]

2.2 Classification of Manufacturing Industry in International Trade

The productivity ability of a country can be reflected by the manufacturing, and it is an important indicator to distinguish developing and developed countries. According to the latest edition of the International Trade Standard Classification (Rec. 4), the classification SITC5-SITC8 is a manufacturing product. In this article, the intra-industry trade of the manufacturing industry is within its scope. Among them, SITC5 + SITC8 are Capital Technology-intensive products, and SITC6 + SITC8 are Labor-intensive products.

2.3 Related theories of intra-industry trade.

The theory provides a theoretical basis for intra-industry trade of homogeneous and heterogeneous products from the aspects of heterogeneous products, imperfectly competitive markets, and economies of scale. This section mainly introduces the relevant theories of intra-industry trade theory.

2.3.1 Internalization Theory

Market internalization refers to the existence of oligopoly forces due to incomplete market competition. For their own benefit, multinational companies may increase the cost of their products because of the risk of leakage in product pricing. Through international direct investment, multinational companies conduct product business within the enterprise, form integrated operations within the enterprise, and internalize the external market.^[8]

2.3.2 Demand similarity theory

One of the conditions for international trade is similar demand. The more similar the needs of the residents of the two countries, the greater the possibility of trade between them. To a certain extent, per capita income represents the needs of residents. The smaller the difference in per capita income of two countries is, the more similar the needs of the two countries are. The similar demand goods will become trade products of them. The income levels have been improved, and the similarity of demand for products of the two countries will increase, so that trade between the two countries will expand. Therefore, if the two countries have similar incomes, the trade relationship will be closer, the income gap will be too large, and the trade closeness will be small.

3. The development of Intra-industry Trade in China-Korea Manufacturing Industry

3.1 Background of China-Korea Manufacturing Intra-industry Trade

The trade between China and South Korea develops rapidly. The bilateral trade volume between them has increased by nearly forty times from 5.03 billion US dollars in 1992. The trade volume between the two countries reached 280.26 billion US dollars in 2017. China has always been at a disadvantage in China-ROK trade. China's trade deficit has always existed and has not improved with the development of trade.

The data from 2008 to 2017 were selected to calculate the proportion of the total import-export trade between China and South Korea in the total import-export trade, the proportion of trade in manufacturing products has remained above 90%, and manufacturing products have always been the main trade products between two countries. In recent years, the proportion of trade in manufacturing products has continued to rise. Manufacturing products are important trade products

between China and South Korea.

3.2 Development Status of China-South Korea Manufacturing Intra-industry Trade

In order to show the level of intra-industry trade. China and South Korea's manufacturing industry, we choose the internationally used GL index.. The formula is as follows:

$$GL_i = 1 - \frac{|X_i - M_i|}{X_i + M_i} \quad (1)$$

$$GL = 1 - \frac{\sum_{i=1}^n |X_i - M_i|}{\sum_{i=1}^n |X_i + M_i|} \quad (2)$$

According to the calculation formula of GL index, calculate the level in the recent ten years:

Table 1 GL index

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GL	0.65	0.67	0.63	0.63	0.65	0.64	0.68	0.68	0.68	0.68

Note: according to the UNcomtrade database.

According to Table 1, from 2008 to 2017, although the index maintained a high level, the overall intra-industry trade index of manufacturing industry did not improve significantly, indicating that the development remained stagnant. After 2009, the level of intra-industry trade showed a downward trend, which was greatly influenced by the external international trade environment.

Trade between China and South Korea has been developing since the establishment of diplomatic ties, but the problem of trade deficit has also been existing. China is at a disadvantaged position. China and South Korea are important trade partners for each other, and manufacturing products are the main trade products between them. Intra-industry trade has become the mainstream trade pattern between China and South Korea. Therefore, in order to improve China's position in trade, China should actively develop intra-industry trade in manufacturing products with South Korea. However, the intra-industry trade between them is a type of vertical trade, and China is at the low end with low technology content and low added value of products. If this low-end intra-industry trade continues to develop, it will further widen the trade gap between China and South Korea and worsen China's trade situation.

4. Empirical study on Intra-industry trade between China and South Korea

According to existing scholars' theories and research results, five influencing factors on intra-industry trade of manufacturing industry of China and South Korea were selected, and regression empirical analysis was conducted based on the existing data to obtain the effect of each factor, and judge whether the selected influencing factors had an impact on intra-industry trade of manufacturing industry of them.

4.1 Selection of influencing factors for intra-industry trade between China and South Korea

Most researchers study the development of intra-industry trade through direct investment, the difference in per capita income between the two countries, technological level, market openness of the two countries and economies of scale, and have achieved remarkable results. So this article still choose south Korean foreign direct investment in China, per capita income gap between China and South Korea, China's manufacturing technology level, China and South Korea market openness, as well as the factors affecting the economies of scale that both China and South Korea manufacturing intra-industry trade as the research variables, research on its impact on China and South Korea manufacturing intra-industry trade.

4.2 Empirical analysis

In order to make the verification more effective, this chapter adopts data from 2008 to 2017, conducts empirical analysis based on the results of previous scholars and combined with my own ideas.

4.2.1 Model assumptions

The first is the explained variables of the model. This section selects the GL index to represent the level of intra-industry trade between China and South Korea, and analyzes the influence of other influencing factors.

The second is the model's explanatory variables. This section selects Korea's direct investment in China, the difference in per capita income between China and South Korea, China's manufacturing technology level, economies of scale and market openness of the two countries as the research objects.

In this paper, the index of intra-industry trade produced by the international standard classification of trade (REV.4) is calculated. The South Korea's investment in China to choose is the actual investment in China, South Korea, China and South Korea per capita gap with South Korea's per capita income minus the calculate China's per capita income, China's manufacturing technology level by China's high-tech products exports accounted for the proportion of manufacturing to quantify, economies of scale is expressed as the average of the GDP, the two countries China and South Korea market openness to trade between the two countries said the mean of the total GDP.

4.2.2 Data sources

The sample data are respectively from the national bureau of statistics of China, the world bank database, UN Comtrade, and the national bureau of statistics of South Korea. The sample data of the past ten years are as follows:

Table 2 Sample data

Year	GL	South Korea's direct investment in China (\$ 10,000)	Per capita income difference between China and South Korea (USD)	Proportion of China's high-tech exports to manufacturing exports (%)	Economies of scale (\$100 million)	Market openness of the two countries
2008	0.65	313532	13863	25.57	28002.13	0.71
2009	0.67	270007	11533	27.53	30059.44	0.60
2010	0.63	269217	14385	27.51	35975.60	0.65
2011	0.63	255107	15277	25.81	43875.09	0.69
2012	0.65	303800	14871	26.27	48916.77	0.66
2013	0.64	305421	15498	26.97	54564.15	0.63
2014	0.68	396564	16382	25.37	59468.53	0.59
2015	0.68	403401	15529	25.65	62237.15	0.53
2016	0.68	475112	15863	25.24	63028.98	0.48
2017	0.68	367253	15064	23.81	68842.26	0.51

4.2.3 Model construction

According to the consumption, relevant sample data from 2008 to 2017 are respectively substituted. In order to eliminate the impact of units between different variables, data need to be standardized in advance. After standardizing the data by SPSS, multiple regression was performed.

Table 3 Multiple regression results

	Coefficient	Standard error	t-test
X ₁	0.072	0.031	2.31
X ₂	-0.087	0.041	-2.11
X ₃	-0.005	0.017	-0.28
X ₄	0.059	0.043	1.38
X ₅	0.033	0.041	0.79
Constant term	0.659	0.003	203.46

This is the equation obtained from the above results

$$y=0.659+0.072x_1-0.087x_2-0.005x_3+0.059x_4+0.033x_5 \quad (4)$$

After the regression of the sample data in recent ten years, it was found that the model determination coefficient $R^2=0.897$, indicating that the overall fitting degree of the equation was good, and the interpretation degree of independent variables to dependent variables reached 89.7%. The F value is 7.001, passing the F test, and the P value is $0.041<0.05$, indicating that the independent variable has a significant influence on the dependent variable to the extent of 95%. In the t-test of the independent variables, it was found that x_1 and x_2 were significant at the 95% level. The effect of x_3 , x_4 and x_5 on GL index is not significant.

4.3 Result analysis

4.3.1 South Korean foreign direct investment in China with GL index were positively correlated

Foreign direct investment creates trade substitution for the home country as well as trade creation for the home country. This paper adopts the data related to Chinese and Korean manufacturing in the last ten years from 2008 to 2017, and the regression of the econometric model shows that there is a positive correlation between Korean direct investment in China and intra-industry trade in Chinese and Korean manufacturing. For every percentage point increase in Korean direct investment in China, the GL index rises by 0.072 percentage points. The main form of foreign direct investment is transnational corporation. Large south Korean multinational companies invest in china-related manufacturing companies and export goods from South Korea to China, although to some extent it will increase China's trade deficit and reduce China's exports to South Korea. However, the technology spilt from South Korea's direct investment in China has promoted the infrastructure construction of local Chinese enterprises, enhanced the competition awareness of local enterprises, enabled mainland enterprises to actively improve product quality, and provided references for the management system and talent training system of Chinese enterprises.

4.3.2 The per capita income difference between China and South Korea is negatively correlated with GL index

With the reduction of per capita income between China and South Korea, the trade between the two countries is promoted, which also promotes the intra-industry trade between China and South Korea. The narrowing per capita income gap has been accompanied by rising incomes in China, accompanied by strong demand for manufactured goods. In recent years, South Korea's per capita income has also been increasing, and residents of the two countries have become more and more alike in their demands for manufactured products, while the scope of their demands for similar products has also been expanding.

4.3.3 Other factors

According to the above economic model research, the influential factors of China's manufacturing technology level, the scale economy of China and South Korea, the degree of market openness of China and South Korea are not significant. influences. The impact of the improvement of the technological level of China's manufacturing industry on the intra-industry trade of China and

South Korea's manufacturing industry is reflected in the promotion of the specialized division of labor in China's manufacturing industry. The impact of the economies of scale in China and South Korea on the intra-industry trade between China and South Korea is more reflected in the reduction of production costs caused by the improvement of production technology, which brings benefits to consumers in both countries. The average value of China's and South Korea's total imports and exports as a percentage of GDP is used to represent the degree of openness of the two markets. The average value reflects the common trend of market openness of the two countries and cannot show the degree of market openness of China and South Korea.

5. Countermeasures and Suggestions

5.1 Give play to China's advantages and actively introduce direct investment from Korea

China has a traditional advantage of abundant resources and cheap labor. However, in recent years, the region of southeast Asia has also developed rapidly, and the cost of production in China keeps rising, so many large multinational companies withdraw from the Chinese market and go to the southeast Asian market. At present, the perfect infrastructure construction and the huge domestic market scale are important advantages to attract Korean investment to China. We should continue to give full play to our advantages in manufacturing and attract horizontal investment from South Korea.

5.2 Expand domestic demand and raise consumption level

Raising China's national income plays a positive role in promoting intra-industry trade between China and South Korea's manufacturing industries, and also plays a positive role in promoting China's economic development. As one of the three main driving forces of economic development, consumption plays a much higher role in economic development than investment and export. Our country ought to carry out the plan of increasing resident income. We will improve the structure of individual income tax, narrow the income gap, and raise the minimum wage. The improvement of China's resident income level can expand the similarity and trade scope of products traded within the manufacturing industry between China and South Korea, which is conducive to the development of horizontal intra-industry trade between them and the improvement of China's trade quality.

5.3 Vigorously cultivate economies of scale

Under the current situation, merger and acquisition is a powerful measure for enterprises to realize economies of scale. It means for enterprises to enhance their competitiveness and market position to expand enterprise scale through reasonable internal and external expansion. Most Chinese enterprises have small production scale and lack core competitiveness. In the process of merger and acquisition, we must realize economies of scale in the main business, improve industrial concentration, enhance the core competitiveness of enterprises, and reduce the risk of merger and acquisition. China's domestic manufacturing enterprises actively develop economies of scale, playing an important role in industrial upgrading. With the improvement of the level of China's manufacturing industry, China and South Korea have developed the inter-industry trade model of horizontal manufacturing industry, which is of great significance to improving China's trade position.

5.4 Increase investment in scientific research and enhance China's scientific and technological strength

In the final analysis, China is still a developing country, and its soft power in science and technology is far behind that of the newly developed country. It is of great significance to improve China's trade status to upgrade the current level of science and technology. China's science and technology is in the stage of rapid development but still in a relatively weak position. Ying dao actively studies the science and technology of Korea and other developed countries, learns and absorbs its excellent technology and then innovates again, becoming China's own industrial technology. China should increase the investment in learning and improve the laws and regulations

related to the introduction of advanced technology. To promote the tacit cooperation between China's large manufacturing enterprises and China's scientific research institutions, constantly improve China's innovation capacity, and promote China to become a real scientific and technological power.

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