

# The Specialization of Global Value Chains and Trade : A Review of Research

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**Abstract:** In recent years the participation degree of Global Value Chains (GVC)specialization has been improved in China in global production network, many domestic scholars have studied on the phenomenon of this specialization in China, the main research contents are divided into two aspects: the first is about the current situation of GVC in China, the second is the economic effects by the specialization of GVC in China. Based on the research above, this paper analyzed and summarized domestic related literature and put forward the future direction of this research.

## 1. Introduction

The specialization of GVC is a special kind of evolutionary process for economic internationalization. Its core connotation is that different process or parts of particular articles' production has spread into a trans-regional or international production chain or system. In the early 1960-1970s, scholars abroad have studied the specialization of GVC. As this specialization and trade prevail in the field of global economy, scholars who research this phenomenon have gradually increased.

Although China has already participated in the specialization of GVC at the period of opening up, the fact is that domestic theoretical studies of the specialization just began in twenty-first century, with a fairly late start. In recent years, with the increasingly growing influence of the specialization of GVC on foreign trade in China, majority of domestic scholars came to pay attention to this issue. Domestic researches mainly were divided into two categories: one is pure theoretical studies of the specialization of GVC based on what foreign scholars have studied; the other is to analyze the situation and related issues that China participates in the specialization of GVC. This paper will mainly review the latter.

## 2. Current Situation of the Specialization of GVC in China

Considering the literatures in China, the total number of studies on the specialization of GVC is considerable. They mainly cover those aspects: the first is the measurement and analysis of China's participation degree of this specialization; the second is explaining the influence of the specialization of GVC on competitiveness of China's industries; the third studies on influencing factors of the specialization of GVC in China.

### 2.1. The Measurement of the specialization of GVC Level

The most representative scholars for the measurement of the specialization of GVC level includes the team from China Center for Economic Research (CCER), Peking University in 2006, Wang Jianhua in 2007, Huang Xianhai in 2007. All of them applied Hummel's measurement model and related years' input and output table of China, figuring out the degree of vertical specialization of China's export or related industries.

The team from CCER, calculated China's export shares of vertical specialization share (VSS), and the VSS of export against America. The VSS of export in 2003 has risen to 22.9 percent from 14.7 percent in 1992; The VSS against America has grown from 14.7 percent to 22.9 percent at the

contemporary period. It seemed that these data indicated that China has deepened its participation degree during twelve years. However, the team, after conducting deeper analysis, had a discovery that either the growth of export VSS or China's VSS against America was due half to the higher value's proportion of intermediate product imported from Japan, Korea, Association of Southeast Asian Nations. Zhao Wei and Ma Zheng in 2007 used the same methods with distinction of sectors to calculate the VSS in three typical years, 1995, 1997, and 2000. The Data showed that the VSS in China has increased to 19.45 percent from 13.3 percent in 1995. Among these sectors, the degree of vertical specialization positioned at the highest place, esp. machinery manufacture industry going to the top. All reflected that the degree of vertical specialization in China has been greatly improved, and the industries' structure of export has been upgraded to some extent.

Huang Xianhai and Wei Chang in 2007 measured the degree of vertical specialization of China's export manufacture industries from 1992 to 2003, in two aspects of major nine parts and four elements-intensive industries. The result illustrated that China's degree of vertical specialization manufacture industries has ascended to 29.4 percent in 2003 from 16.8 percent in 1992; in light of industrial sectors, the highest VSS was of machinery equipment manufacture industry; in element-intensive aspect, capital and technology- intensive industries maintained the highest degree.

Wang Jianghua, Chen Yongpeng, and Xu Huliang in 2007 came up with the detailed measurement formats of industries based on Hummel's model of vertical specialization. Meanwhile, taking textile and clothing industry as example, they calculated its degree of vertical specialization based on entire China as well as Jiangsu, Guangdong, and Shanghai. The result showed that the degree of textile industry's vertical specialization was relatively high while the degree of clothing industry's vertical specialization was relatively low.

## 2.2. The Analysis about International Status of China in specialization of GVC

With reference to the researches of international division in China viewing from aspects of the specialization of GVC, scholars set out to make analyses on proportion of import and export at the beginning. Among them, scholars who were early to pay attention to this aspect were Gao Yue and Gao Feng in 2005. They adopted the method used by Francoise Lenmoine and Deniz Unal-kesenci, whose main contents elaborate commodities, on basis of their main usages, were divided into, intermediate products which could be further divided into components or spare parts and half finished-products, and final products which also could be divided into consumer goods and capital articles. Then they calculated import and export proportion of these classified products in 1997 and 2007 as well as their contribution degree to trade balance.

Through analysis above, it came to a conclusion that the position of vertical specialization in China was that China imports intermediate products, and then processes them with accessories as final products which were largely consumer goods, and export these final products, namely consumer goods. Lu Peng in 2007 pondered that the Eastern Asian regions' model of division has transformed from "Goose Market Model" to regional production net in the Eastern Asian areas with the economic development of countries in the Eastern Asia. Having taken advantage of Hummel's model for measuring GVC, he calculated China's the VSS of export from 1992 to 2003. Data proved that China was going to become an important member in this regional production net. Nonetheless, in recent years, the proportion of importing parts and components in manufacture industry was far higher than the proportion of exporting. This evidence indicated that China in the international division, lied a relatively lower level, within present region engaged in processing and assembling links. There are still other scholars who studied the degrees and status for China participating in international division within products on basis of experience. Here taking electronic machinery products as an example, electronic machinery products play a decisive role in foreign trade in China. Besides, this industry has developed as the most rapid one among other in the specialization of GVC industries around the world, due primarily to its inherently technical features. Whereas, taking this type of products as an example could explain the basic situation of the specialization of GVC to some extent.

Zhang Mingzhi and Li Chunsheng adopted Sanjaya Lall's methods to divide electronic

machinery products to components and finished products, calculating the rate of component and finished products among export in China, and conducting the analysis of trade flow for intermediate inputs at the same time. Finally it came to a conclusion: although China lies at the low level of the specialization of GVC' value chain, production part of China has appeared a growing trend; looking from the geographical flow of trade, China has not been limited in the Eastern Asian production net anymore, but expanding to the global production .

### **2.3. Analysis of the Influence of the specialization of GVC on Industrial Competitiveness in China**

Some scholars studied the competitiveness of China industries under the changing international competitive environment mainly such as Sun Xiaodi, Sun Jingwei in 2006 and Hu Shaoling in 2007. Zhao Xiaodi analyzed competitiveness of major industries in China from 1990-2000, through both Revealed Competitive Advantage (RCA), and Trade Competitive Index (TCI). They found out an upward trend of international competitiveness in technology-intensive or capital-intensive industries and a downward trend of international competitiveness in labor-intensive industries. Concurrently, Zhang Xiaodi conducted the regression analysis only for effects on China's international competitiveness of vertical specialization based on TCI as a variable being explained, VSS and LPI as explanatory variables. The outcome showed that vertical specialization has facilitated greatly the growth of international competitiveness of technology-intensive or capital-intensive industries while it hasn't promoted too much in the increase of international competitiveness of labor-intensive industries. On the one hand, the reason for the outcome is that since the mid of 1990s, vertical specialization has made full use of technological spill-over effect, industrial relationship effect and export channel effects, in technology-intensive or capital-intensive industries so that basic elements' quality used in these industries has been improved, productive power as well. Therefore, vertical specialization functions well, accelerating the increase of international competitive power of related industries. On the other hand, the unobvious promotion of labor-intensive industries is due primarily to the low participation degrees in global vertical specialization and rough processing. Nonetheless, generally speaking, the growth of vertical specialization's degrees contributed to the upward of the international competitiveness of industry in China.

Being different from the researching result of Zhao Xiaodi, Hu Shaoling held a view through measurement analysis, that international vertical specialization has positive influence on competitiveness of both technology-intensive or capital-intensive industries and labor-intensive industries. Moreover, what the vertical specialization facilitates more was technology-intensive or capital-intensive industries. It was because of the choice of international competitive index why their results were not entirely equivalent to each other. To be mentioned here, Hu Shaoling chose EXP as international competitive index.

### **2.4. Analysis of Affecting Factors of China's Participation in the specialization of GVC**

Some scholars adopt empirical and theoretical methods to analyse factors, which influence China's participation in vertical specialization. Liu Zhibiao and Wu Faxiang in 2005 measured participation degrees of the specialization of GVC in the Yangtze River Delta, and conduct an empirical analysis of influential factors with the help of industrial data. The result indicated that degrees of the specialization of GVC correlate positively with industrial export-oriented degree, extent of capitalization and other factors, but correlates negatively with transaction cost.

Wang Aihu, Zhong Yuchen in 2006 also made an empirical analysis through nine provinces' data, which leads to a conclusion that what results in the shift of multinational companies' processing parts and their relocation are economic environment in domestic market, development of industry and specialization of industry, and foreign economic policies. Those regions which were better in these aspects would have the higher participation of vertical specialization in manufacture industry.

Zhao Wei and Ma Zheng carried out an empirical analysis on the major factors which influence the trade in vertical specialization in China. The conclusion was that the degrees of vertical

specialization correlate negatively with tariff rate, industrial scale, and import dependence degree while it correlated positively with export and import structures.

By doing both theoretical and empirical analysis in 2008, Hu Shaoling and Zhang Rui found that participation degree of the specialization of GVC correlates inversely with the wage level in manufacturing industry, while it correlated positively with labor productivity, educational level of laborers, scale of manufacturing industry, and the extent of economic development and the opening up to the outside world.

All in all, scholars are roughly in consensus of conclusions when they studied the extent and status of participation in the specialization of GVC in China. Namely China's participation in recent decades has been deepening gradually, and industrial structures in China were upgraded to some extent. Although China lies in the low position of the value chain of international division within the product, it appears to go through an upward trend. On the issue, that what the specialization of GVC affects the industrial competitiveness in China, and how the specialization of GVC been affected, conclusions of scholars vary slightly from each other due to different analysis perspective.

### **3. Economic Effects of the Specialization of GVC in China**

In light of theoretical analyses of foreign scholars about the specialization of GVC, it must exert more or less economic effects on our country. For example, technology diffusive effect and changes of trade income distribution do have influence on the productivity of one nation and income distribution. Thereby many domestic scholars were engaged in analyzing economic effects of China's involvement in the specialization of GVC.

#### **3.1. Technology Diffusive Effect**

Through the data of patent application and labor employment, Huang Chunyuan and Tong Jiadong in 2007 analyzed whether Learning-by-Doing Effect is the key factor for agglomeration in geography. Its conclusions: innovation and invention in China were separated from production location; there was no directly causal relationship between innovations or invention and production; achievements of innovation and invention largely result from the numerous influences of capital and technology's investment. The spill-over effect of FDI was mainly reflected on miniature creative programs, such as utility patent, appearance design patent and so on. If the innovative invention needed essentially professional knowledge, there would be no spill-over effect for FDI. Some scholars came to different conclusions through empirical analyses. Zhang Ji in 2008 made use of serial numbers from 1980 to 2005, and implemented a Co-integration Analysis, regarding technical extent as a variable being explained, and the extent of the specialization of GVC in addition to labor capital as explanatory variables. The result exemplified that extent of the specialization of GVC and labor capitals were important factors in the long term to technological advance, and correlating positively with it. Thereby Zhang Ji held that a view that it was a magnificent way that enterprises in China obtain the technological diffusive effect to improve their skills of production through participating in the specialization of GVC.

#### **3.2. Distribution of Trade Benefit**

Song Yuhua, Zhu Siming in 2008 with aids of analyses pondered that under vertical specialization, various sectors involved in different production parts, among which benefited distribution of production and trade was closely concerned with the price of intermediate products. Under certain circumstances in the domestic market, prices of intermediate products depend on market shares of intermediate products. Zhang Ji established an income distribution model for the specialization of GVC. Analyses lead to a conclusion that market structure of each part for division of labor determines its profitability, while it was influenced sometimes by scale economy, factor scarcity, enterprises' core competitiveness and many other approaching barriers. In addition, Zhang Ji took the industry of notebook as an example.

Zeng Zheng, Zhang Lulu in 2008 used modern additional trade value index to evaluate the trade benefit of eight major manufacture sectors from 1997 to 2006 in China. They discovered that trade

benefit of China had great promotion in absolute numbers by making use of advantages of domestic population resources. During the contemporary period, in China, the rate of additional trade value against America changed slightly. But the fact was that export in China surged at high speed based on severely expanded export volume, especially the type of processing trade, which transferred other countries' trade against America, and forces China having a real situation of faint trade surplus.

To sum up, Zhang Ji and Song Yuhua thought that the benefit participating the specialization of GVC was concerned with production parts actively involved in. Nevertheless, Song Yuhua discovered that trade benefits distribution on different parts of the specialization of GVC were further determined by prices of intermediate products. Zhang Ji pondered that benefit distribution was decided by market structures of each production part. And Zeng Zheng as a representative of one theory, studied the dynamic trend of entire income gains occurred by this specialization.

### **3.3. Influences on Productivity of One Country**

To develop Chinese Economy, studying the influences of mechanism of the specialization of GVC against labor productivity in China is a really hot issue in modern theoretical researches of international trade. Xi Yi and Zhang Erzheng in 2008 made use of input-output table to calculate industrial outsourcing rates of thirty-five industries. At the same time, they examined the influence of outsourcing on whole staff's labor productivity based on panel data model. Furthermore, they tested the influences of outsourcing on employment and output. In consequence, they found that enterprises could enhance its labor productivity by outsourcing some non-core operations. Chen Yi viewed that the reason why labor productivity got improved was that outsourcing maked technological advance of capital saving. Besides, the influences of outsourcing on output were reflected two aspects: the first was forcing the border of production possibility curve to more toward the outside; the second was accelerating the transformation of production structures of products from labor-intensive type to capital-intensive type.

Huang Shaoling in 2007 pondered that the specialization of GVC deepen international division from between industries to within processes of one product, which benefited in optimizing resources arrangements, saving costs, improving labor productivity. Meanwhile, she adopted twenty major industrial panel data in 1992, 1997, 2000 to carry out an empirical analysis of influence for the specialization of GVC on productivity, which found that the way of technology diffusive effect promoted not only the growth of productivity through participating in the specialization of GVC, but more positive influences of the specialization of GVC on productivity in capital and technology-intensive industries and export concentrated industries.

### **3.4. Effects on Income Distribution**

In light of domestic literatures, there are few literatures which discuss on each industrial income distribution. The specialization of GVC and trade, at present, only Zong Yijun in 2008 applied industrial panel data from 2003~2005 to study influences of the specialization of GVC and trade on industrial average salary in China. He found that the specialization of GVC facilitates the growth of salary in capital-intensive and labour-intensive industrial in our country. But the effects were more obviously on capital-intensive industries. This means international the specialization of GVC furthers the enlargement of industrial average in China. To study China's participation in the specialization of GVC and trade is still a completely new field. There are also lots of problems urgent to be solved.

## **4. Future Studying Directions**

We can consider it from three aspects. Firstly, the merchandise structure of China's trade and its changes from the perspective of the specialization of GVC will be analyzed. Through participation in the specialization of GVC and trade, is there any great improvement of the merchandise structure in China? In details, we could analyze the role of the specialization of GVC and trade in improving China's merchandise structure from the empirical aspect. Secondly, we could make researches on

influences of the specialization of GVC in different industries. There were not many literatures about this issue at present so that it will become a studying direction of China's participation in the specialization of GVC and trade. Thirdly, it is that what China should do to adjust trade development strategies in order to upgrade industry smoothly while China faces opportunities of the specialization of GVC and trade prevailing around the world. For China as a developing country, it is a new way to achieve industrialization through the specialization of GVC. Thus, what is the relationship between the specialization of GVC and industry upgrading? What China should do to adjust trade development strategies to solve these problems? All questions above will be our directions for further studies in China's participation in the specialization of GVC.

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