

Global Value Chain Restructuring and Impact on China's Manufacturing Industry under the New Crown Pneumonia Outbreak

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Abstract

The outbreak of new crown pneumonia and trade war have become the biggest uncertainty factor affecting world economic growth and global value chain system, and how to stabilize the world economy and promote the restructuring of global value chain has become an urgent task facing all countries in the world. As the world's second largest economy, China has played an important role in promoting world economic growth and stabilizing the global financial market order. What are the deep-seated reasons for global value chain refactoring? What are the key factors driving global value chain refactoring? How does the impact of the outbreak affect global value chain reconstruction? How can China correctly respond to the global value chain reconstruction to enhance the supply stability and competitiveness of the manufacturing industry chain? It is the core issue to be studied and discussed in this project. On the basis of absorbing the relevant theoretical achievements from China and abroad, this project analyzes the current situation of the world economy under the outbreak of new coronary pneumonia, and then adjusts and reconstructs the global value chain from the system level and the structure level respectively. The so-called evolution and adjustment of system level refers to the change of ability and position in global value creation and value distribution between different industrial categories in the world, while the evolution and adjustment of structural level refers to the change of ability and position in value creation and value distribution between different enterprises within the same industrial category in the whole world. Finally, on the basis of global value chain reorganization, the impact of the epidemic on China's manufacturing industry chain is analyzed, and corresponding policies and suggestions are put forward.

Keywords

New Crown Outbreak; Global Value Chain; China Manufacturing.

1. Introduction

Since the 1980s, the rapid development of economic globalization, characterized by the production factors of transnational flows, and the division of global value chains, characterized by the decomposition of product production links and stages and global distribution, have gradually become the dominant form of international division of labor. The essence of the division of global value chain is that transnational corporations lay out their production networks on a global scale, taking advantage of different factor endowments in various countries and regions to allocate production links and stages with different factor intensity characteristics to the most suitable regions. The formation of global value chains stimulates the potential comparative advantages of countries, significantly improves the efficiency of division of labour, and makes network relationships in the economic cycle of production, distribution, exchange and consumption more complex and close, and provides conditions for exogenous

shocks to have an unpredictable negative impact on the global industrial chain supply chain system through the value chain. The division of global value chain is actually the further subdivision and deepening of comparative advantage in the traditional international division of labor model, lowering the threshold of international division of labor, so that more table goods and services can participate in international trade, thus optimizing the allocation of global resources and improving the overall welfare level of the world. In times of world economic prosperity, problems hidden in the process of economic globalization are often "ignored" or covered up. In fact, since the onset of the global financial crisis in 2008, the global economy has entered a period of deep adjustment. The driving force of the industrial technology revolution driving the evolution of the division of labor in global value chains has gradually weakened, while the new impetus based on a new round of industrial technology revolution has not yet been formed. The phenomena of "opportunity inequality" and "position inequality" in the evolution of the division of labour in global value chains are also prominent. As a result of location factors, natural conditions, geographical environment, factor endowments and other factors, some countries, especially the least developed countries, are increasingly marginalized in the international division of labour, developing countries are at the lower end of the value chain, and even face the dilemma of "low-end lock-in". As a result, developing countries generally have subjective demands for global value chain reconstruction. Developed countries also have the requirement of global value chain reconstruction, because of the international industry and product production gradient transfer there is the problem of industrial hollowing, developed countries also have "high-end return" and other subjective demand for global value chain reconstruction. Because the subjective requirements of the reconstruction of developed and developing countries are different global value chains, such as in the new round of industrial and technological revolution, who can take the lead in achieving key points and even cluster breakthroughs and other objective factors of technological innovation changes are equally difficult to predict, therefore, under the interweaving of various complex factors, the direction of global value chain reconstruction is still full of great variables and uncertainties. This is also the current economic globalization development environment is increasingly severe and complex reasons.

The global outbreak and spread of the new crown outbreak has had a significant negative impact on global production and consumption activities. The outbreak has had a great impact on China's domestic industrial chain network. First, the physical obstruction, logistics interruption, sales stagnation and order delay brought about by the "sealing city" everywhere, then the industrial chain affects each other, the supply of spare parts is interrupted, other industries other than medical supply problems are prominent, production is unsustainable, coupled with the national human resources flow delay and reduction, capacity capacity shortage brought about slow resumption of production, manufacturing industry employment, inventory, production, transportation, orders, etc. have a serious impact. The "butterfly effect" brought about by the severe outbreak in China on the global industrial chain is obvious. China has been deeply embedded in the complex global industrial chain and become the center of the global industrial chain network, the impact of the epidemic on China's economy and enterprises has spread to all parts of the world, the impact on the global industrial chain can not be ignored.

2. Overview of the Article

2.1. Related Research on Global Value Chain Reconstruction

Sun Yutao (2020) from the supply-side perspective, to deepen the supply-side structural reform, open up the domestic large-cycle supervision of the second vein, as well as reconstruct the structure and position of the global value chain, promote international recycling, and finally internal and external cycles to promote each other, forming a new open pattern. Gao Yunsheng

(2020) believes that under the background of global value chain reconstruction, in view of the current situation of China's manufacturing industry development, adhere to the innovation-driven development strategy and enhance the technological innovation ability of manufacturing industry. Then expand the level of manufacturing opening up, deepen the international vertical specialization division of labor and cooperation to enhance economies of scale and productivity. Based on the analysis of the current situation of processing trade development in the five northwest provinces (regions) under the reconstruction of global value chain, Harajuki (2020) points out that its development has weak industrial agglomeration effect, short industrial chain, low level of independent innovation and poor processing trade policy environment, and puts forward that the transformation and upgrading of processing trade in northwest China can be promoted by speeding up the construction and development of the trade platform of the five northwest provinces, adopting the "yuan model" to achieve East-West capacity docking and introducing advanced technology. Zhang Mingzhi (2019) believes that China can minimize the negative impact of Sino-US trade frictions by taking into account GVC (domestic value chain) and NVC (international value chain), strengthening core technology research and development, promoting the development of multilateral, regional and bilateral trading systems, and diversifying export markets and import markets for raw materials and key components. (Tessmann, Jannes, 2020) illustrates the institutional drivers of value chain restructuring in specific regions. Recognizing that value chains exist in a vacuum, but are rooted in geographically specific institutional environments, they pay particular attention to the role of institutions at the national and subnational levels in shaping the geographical and organizational structure of global production and trade. They used an "institutionally rich global value chain approach" that linked the agency of economic actors to the pressures exerted by their institutional environment. (M. Ramioul, B. de Vroom, 2009) focuses on the role of knowledge in value chain restructuring and its impact on work organization and the use of knowledge and skills. The key point of view is the impact of the increasingly complex and highly dynamic nature of the company's structure, production and labour processes. Four different questions were studied: What is the role of knowledge in value chain restructuring? What is the impact of value chain reorganization on the use and management of knowledge in the organization? What is the impact of restructuring on the skills employees need? What is the impact on the domestic labour market and the structure of vocational training in the region or sector?

2.2. Related Research on Manufacturing under the Global Value Chain

Yan Liangqun and Li Xingjie (2011) from the industrial upgrading motivation to study the upgrading mechanism of the manufacturing industry, the performance of the upgrading of the manufacturing industry structure is in the value chain to the high-end link. Mahonfu (2015) through the study of the original driving force to promote the upgrading of manufacturing industry, found that the promotion of independent innovation as the original driving force can improve the traditional manufacturing production mode and production technology to improve production efficiency, that is, the reduction of production costs, but also to promote the cultivation of new industries and new factors of production. Yang Ligao, Yu Shihao and Han Feng (2015) studied the relationship between the quality of human capital and the upgrading of manufacturing industry. High-quality, high-skilled human capital, as the most creative factor of production, can improve the efficiency of enterprises through enterprise management and technological innovation, so as to achieve the goal of upgrading. Yu Donghua and Tian Shuang (2019) analyzed the impact of embedded global value chains on manufacturing upgrading through models, and concluded that the upgrading path of manufacturing industries in the value chain presents a "U" relationship, and realizes the transformation of regional markets to research and development design and brand marketing links in the value chain by increasing

research and development investment. Agostino et al. (2015), a foreign scholar, studies the effects of manufacturing upgrading in Italy from the perspective of productivity and finds that among all the factors affected, innovation ability and international market have a significant strong effect on the strong upgrading of manufacturing industry, and enterprises with strong innovation ability and high market share are more competitive than other enterprises. Gereffi (2005) believes that under the global production system, industrial upgrading is mainly reflected in the transformation of industry from low value-added to high value-added links, and in the value chain, mainly reflected in the transformation of brand marketing direction from processing and manufacturing to product development. Kaplinsky and Readman (2005) studied the conditions for upgrading manufacturing, which, if it wanted to upgrade, had to have a certain degree of monopoly power in the market and a certain market share that had been expanded by monopoly power.

3. Theoretical Mechanism

From the domestic point of view, the epidemic mainly affects the development of China's manufacturing industry by reducing the degree of factor aggregation and increasing the cost of factors. After the outbreak, labor force can not move freely, logistics, transportation and other factors of production security will fall into a bad development trend, and further trigger a shortage of capital, not only lost the original economies of scale effect brought about by excess income, but also in the period of non-re-work increased many production costs. From an international perspective, the outbreak affects the development of China's manufacturing industry by breaking the global supply chain ecology. Governments therefore need to provide substantial production subsidies to promote manufacturing and further promote the rise of global value chains.

4. Description of the Model and Variables

4.1. Model Build

Based on the data integrity of the study sample, and taking into account the various impact aspects, the measurement model is constructed as follows:

$$nm\text{ps}_{mit} = \beta_0 + \beta_1 \text{gsub}_{it} + \beta_2 \text{tfp}_{it} + \alpha \text{con}_{it} + \text{year}_{it} + \varepsilon_{it} \quad (1)$$

Among them, *i* and *t* refer to the manufacturing industry and the year respectively. $nm\text{ps}_{it}$ Represents the number of *m*-stages of production in the double-digit *i* industry to which the manufacturing industry belongs in the *t*-period, where *m* represents global, domestic and international respectively. *gusb* Representing the government subsidies under the global epidemic, this paper uses the ratio of the industry's government subsidy income to the industry's total industrial output value to deal with the government subsidies on a regional scale. tfp_{it} Represents the average total factor productivity level of the *i* industry during the *t*-period, calculating the total factor productivity level of 29 manufacturing industries for accounting for the total factor productivity level of each enterprise.

4.2. Description of the Control Variable

This article adds the following control variables. (1) Industry Average Enterprise Size (SIZE): Measured by the median of the average sales of enterprises in the (dirical) industry. It is generally believed that the larger the size of the enterprise, the more advantages in economies of scale, production technology or external financing, the higher the economic complexity, the larger the number of production stages in the industry to which the enterprise belongs, the

longer the division of production. (2) Industry Capital Intensity (KL): The ratio of net fixed asset value to industry employee after industry price de-reduction is used to measure. Capital-intensive firms tend to rely on high investment from corporate headquarters and to outsource their business. That is, the higher the industry capital intensity, the greater the number of production stages. (3) High-tech labor force strength (SKILL), using the proportion of industry science and technology activities to the total employment of the industry, generally speaking, the technical ability of the industry outsourcing business is less, so the number of production stages in the industry is smaller, the length of production segmentation is shorter. (4) Industry Market Competition Level (HHI), this paper uses the Huffendahl Index to calculate the degree of market competition in different industries based on the sales of enterprises, the index is inversely proportional to the degree of market competition, which is close to 1 when the trend towards a complete monopoly market, the degree of market competition is weak, the estimated coefficient is negative. (5) Industry average export tendency (EXP), from a national level, enterprises more involved in the international division of labor, may be through the form of global value chain to achieve processing, production links of globalization, the higher the export share of enterprises, the longer the number of international production stages, but this may inhibit the number of domestic production stages, this paper uses (dirution) industry average enterprise export delivery as a proportion of total sales.

5. Empirical Analysis

5.1. Basic Regression

Table 1. The baseline regression result

	globe	domestic	international
	nmps	nmps	nmps
gsub	0.0157*** (0.0054)	0.0201** (0.0080)	0.0141** (0.0060)
tfp	0.0072*** (0.0009)	-0.0015 (0.0013)	0.0094*** (0.0011)
size	0.0489*** (0.0023)	0.0077** (0.0034)	-0.0009 (0.0030)
kl	-0.0507*** (0.0031)	-0.0820*** (0.0046)	0.0102*** (0.0029)
hhi	-8.3090*** (0.3899)	-1.5766*** (0.3439)	-3.0649*** (0.3840)
skill	-0.1553*** (0.0024)		0.0443*** (0.0025)
exp	-0.0039 (0.0120)		0.0720*** (0.0114)
_cons	3.4153*** (0.0278)	2.9999*** (0.0378)	0.4398*** (0.0365)
N	56894	48207	12568
R ²	0.282	0.042	0.234
F	1.8e+03	246.4737	157.4438

Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Using all the manufacturing industry samples in the two industries under the national economic industry classification, this paper empirically examines the impact of government production subsidies as "visible hands" on the global production segmentation, domestic production

segmentation and international production segmentation of China's manufacturing industry. In this paper, the Hausman test is carried out, and the results significantly reject the random effect model, so Table 1 only reports the results of the fixed effect model, and uses robustness estimation to eliminate the heterogeneous problem of panel data.

In Table 1, the impact of government production subsidies on the length of global production segmentation is reported under the condition of controlling a series of related factors, and the regression coefficient of the measured production subsidies is significantly positive. For every 1% increase in government production subsidies, the length of global production segmentation in China's manufacturing sector increased by 0.0157%, 0.201% and 0.0141%, respectively, i.e. production subsidies, as a "visible hand" for government intervention in microeconomic activities, significantly contributed to the global production segmentation length of China's manufacturing industry. This shows that production subsidies are also positive for the division of domestic production in China's manufacturing industry. Government subsidies have a great impact on the length of domestic production segmentation and the length of international production segmentation in China's manufacturing industry. The compiled data show that 40.8 per cent of exporting enterprises receive varying degrees of government subsidies, while only 26.9 per cent of non-exporting enterprises receive government subsidies. This is a preliminary test of the breadth or length of government productive subsidies that promote enterprise participation in global value chains.

5.2. Robustness Test

Table 2. Robustness test results

	(1)	(2)	(3)	(4)	(5)	(6)
	nmps	nmps	nmps	nmps	nmps	nmps
gsub	0.6784*	5.5438**	0.7382*	12.6273***	0.5552***	1.7471***
	(0.3847)	(2.7583)	(0.4399)	(3.8476)	(0.1496)	(0.6322)
tfp	0.0693**	0.2384**	0.0595**	0.3416***	0.0373***	0.0738***
	(0.0059)	(0.0803)	(0.0072)	(0.1106)	(0.0014)	(0.0149)
inno	2.1314**	2.1462**	2.1364**	4.3447***	-0.3453**	-0.3095**
	(0.1464)	(0.1306)	(0.1876)	(0.1846)	(0.0298)	(0.0305)
cost	-0.3046*	0.4393	-0.3056*	0.4469	-0.1870**	-0.0064
	(0.0719)	(0.3623)	(0.0844)	(0.4852)	(0.0165)	(0.0583)
gsub_tfp		-1.5684*		-3.5761***		-0.4039**
		(0.7746)		(1.0833)		(0.1523)
gsub_inno		4.8615**		9.8952***		-0.5525**
		(1.3789)		(1.5688)		(0.2586)
gsub_cost		-6.1502*		-13.5116***		-1.7524**
		(3.1569)		(4.1486)		(0.5194)
gsub ²					-0.6313***	-0.4361***
					(0.1700)	(0.1447)
_cons	3.5195***	3.1058***	3.3368***	2.2469***	-0.0011	-0.1172*
	(0.1634)	(0.3573)	(0.1827)	(0.4803)	(0.0172)	(0.0661)

Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

In order to reduce endogeneity, we use the lag phase II of government subsidy variable as the iv variable in Table 2 to alleviate the co-establishment bias of the model, and column (7) selects the explanatory variable as the proxy variable of the global division of labor. Specifically, the results of columns (1) and (2) show that the coefficient of government production subsidy to global production segmentation is significantly positive, the interaction coefficient between

production subsidy and total factor productivity, production subsidy and transaction is significantly negative, the interaction coefficient between production subsidy and enterprise product innovation is significantly positive, and the results in column (3) and (4) are also significantly tested. This shows that government production subsidies promote the global production segmentation and domestic production segmentation extended, while the increase in enterprise productivity and transaction costs inhibit this promotion, and enterprise product innovation behavior will play a role in promoting. From the (5) column and (6) column, the secondary items of government subsidies are significantly negative at the statistical level of 1%, when the degree of government subsidies is low, the government subsidies this "visible hand" to promote the international production stage; In summary, with the increase of government production subsidies, the increasing division of production, the deepening of the global division of labor, the extension of the industrial chain, when more than a certain intensity, reduce the international production segmentation, the industrial chain has a tendency to shift to the domestic. This is consistent with the results in Table 1, thus further confirming the robustness of the results.

6. Conclusion

Recognize the position of Chinese manufacturing in the global value chain and re-examine the quality and layout of the industrial chain. Recognize the position of regional manufacturing industry in the industrial chain, strengthen the design and management of the industrial chain. Strengthen the "strong immunity" ability of different industries and speed up the adjustment and optimization of industrial structure. To prevent the trend of anti-globalization that may occur after the outbreak, china's global value chain and domestic value chain should be reshaped again. This paper provides a new explanation for Chinese manufacturing enterprises to participate in the division of global value chain, and these empirical findings provide useful reference for how to realize economic transformation and the rising status of global value chain. The intensity of government subsidies to enterprises should be appropriate. Only appropriate government subsidies can improve the level of all-factor productivity of enterprises, encourage enterprises to carry out more new product innovation activities, so as to promote enterprises more and more close links, more and more complex industrial structure, production and trading of the intermediate links more, so that the production stage of products become larger, the production chain of products longer. Therefore, in the context of the global epidemic, the government needs to carry out a detailed assessment of the overall operating conditions and development prospects of pre-subsidized enterprises before implementing subsidies, and provide subsidies in the light of the actual development needs of enterprises to avoid a steady flow of resources to "zombie enterprises". At the same time, government subsidies should be provided to enterprises in a targeted manner in response to local outbreaks. Otherwise, instead of improving the competitiveness of enterprises, it weakens the innovation ability of enterprises, resulting in a large number of overcapacity, decline in corporate performance and even bankruptcy.

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