

Has China's OFDI promoted the upgrading of manufacturing structure-- Research based on interprovincial panel model

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Abstract: With the take off of the Chinese economy, more and more enterprises are investing resources in OFDI, and OFDI and its related economic factors have also had a certain impact on the upgrading of the manufacturing industry. This article studies panel models of 31 provinces in China from 2014 to 2019 using relevant data sources such as the National Bureau of Statistics and the Guotai An Database, and explores the impact of OFDI and its related economic factors on the manufacturing structure. Research has found that OFDI and international trade factors can significantly inhibit the upgrading of manufacturing structure; The per capita income level will have a positive impact on the upgrading of the manufacturing industry structure; The impact of FDI and government fiscal expenditure on the upgrading of manufacturing structure is not significant. In view of the above research results, this paper suggests that the government should adopt appropriate policies to guide OFDI in the manufacturing industry, encourage it to focus on technology intensive or capital intensive industry, and avoid its negative impact leading to "hollowing out" of the manufacturing industry; Enterprises should also optimize their business structure, relocate unnecessary or outdated businesses, invest their main resources in local businesses, and focus on technological upgrades to avoid the adverse effects of OFDI.

1.Introduction

With the rapid development of China's economy, more and more enterprises are becoming enthusiastic about outward direct investment (OFDI). According to relevant data released by the National Bureau of Statistics, China's OFDI has achieved relatively rapid growth for at least 13 years; As of December 31, 2019, the total scale of China's OFDI has exceeded \$2 trillion, ranking third in the world. Such great achievements are closely related to the "going global", "the Belt and Road" and other policies proposed by the country. In the future, we can foresee that China's OFDI will achieve greater growth, and more and more manufacturing enterprises will no longer be limited to the domestic market, but instead embrace the new global market. However, everything has its two sides, and the global OFDI market also has its opportunities and challenges. Manufacturing enterprises need to consider whether to make corresponding foreign direct investment. On the one hand, appropriate OFDI can promote the overall strength of enterprises, help them learn advanced technology and management experience from abroad, or also help them obtain a larger market and save certain costs, Enable manufacturing enterprises to obtain more profits; On the other hand, a large amount of OFDI will indeed occupy some enterprises' already insufficient funds and resources, and have a certain adverse impact on their business staying in China. OFDI will also have a negative impact on some manufacturing related enterprises, especially the productive service industry, which is not

conducive to the upgrading of the overall economic structure.

In response to the above background, many scholars at home and abroad have also conducted some research on OFDI and industrial structure upgrading, and this article has also summarized and organized relevant research literature. These literature viewpoints can be basically summarized into two categories: promoting upgrading theory and inhibiting upgrading theory:

(1) Promotion of upgrading theory: that is, the development of OFDI contributes to the upgrading of industrial structure. Advencula (2000)^[1] and Chen (2012)^[2] studied the situation of OFDI in countries such as South Korea and Malaya, and found that OFDI can significantly promote the development of local industrial structures; Chen Zhihuan et al. (2020)^[3] and An Tongxin et al. (2019)^[4] used Japan as a research sample and found that Japan promotes the development of OFDI through two levels: government (macro regulation, establishing a standardized economic regulatory system) and enterprises (increasing technology intensive and capital intensive investment), thereby having a positive impact on the upgrading of local industrial structure; Chen Yuanqing (2019)^[5] built a panel data model and studied the relevant data of China's OFDI to the Association of Southeast Asian Nations (ASEAN) and industrial structure upgrading from 2008 to 2017, finding that China's OFDI can significantly optimize the domestic industrial structure; Yang Dongxu et al. (2020)^[6] used the panel data of Chinese provinces from 2004 to 2016 and studied the impact of OFDI on the industrial structure from the

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perspectives of capacity transfer and technological progress. They found the following conclusions: OFDI significantly promoted the industrial upgrading in eastern and central China, and OFDI significantly positively affected the optimization of China's industrial structure before the outbreak of the financial crisis; Zhou Sturgeon et al. (2020)^[7] studied the manufacturing panel data of 31 provincial administrative regions in China from 2004 to 2018, and found that OFDI reverse technology spillovers can significantly promote the optimal efficiency of the manufacturing industry in each province in the short term through spatial effects, and improve the innovation capacity of the manufacturing industry in the long term; Liu Hong et al. (2020)^[8] studied the matching data of China's industrial enterprise database and customs database from 2000 to 2013, and studied the impact of OFDI and innovation on export product quality and related industries and structures from heterogeneity and mesomeric effect.

(2) Inhibition and upgrading theory: that is, the development of OFDI is not conducive to the upgrading of industrial structure. There are not many scholars who hold this view, and most of them believe that OFDI may affect the manufacturing structure through the relocation of the manufacturing industry, causing the problem of "industry hollowing out" to become increasingly serious, leading to more severe inflation, higher unemployment rate, imbalanced international balance of payments, and serious problems in economic development (Davis and Huston, 1992^[9]; Barrell, 1997^[10]).

The above literature has conducted sufficient research on the relationship between OFDI and the upgrading of manufacturing industry structure, but its shortcomings lie in the lack of specific analysis of the economic factors related to OFDI on the impact of industrial structure. The marginal contribution of this article is as follows: In addition to studying the impact of OFDI in various provinces of China on the upgrading of manufacturing structure, we also studied the impact of relevant economic factors such as FDI, international trade, per capita income level, and government fiscal expenditure level on the upgrading of manufacturing structure.

Based on the above background and literature review, this article analyzes the relevant mechanisms of OFDI and its related economic factors on the upgrading of manufacturing structure from a theoretical perspective. It uses OFDI, related economic factors, and industrial structure data from 31 provinces in China from 2014 to 2019, and uses two random effects panel models, GLS and ML, to study whether OFDI and its related economic factors promote the upgrading of manufacturing structure.

The following content structure of this article is arranged as follows: The second part is the theoretical mechanism and hypothesis, mainly studying the theories and mechanisms related to the theme of this article, and proposing reasonable research hypotheses; The third part is model design, which mainly describes the model designed based on assumptions and conducts descriptive analysis of the data; The fourth part is the empirical analysis, which mainly conducts the panel model research and conducts a robustness test on the research results; The

fifth part is the research conclusion and policy, mainly summarizing the research results of the fourth part and proposing corresponding policy recommendations.

2. Empirical analysis

In order to study the specific impact of China's OFDI on the upgrading of manufacturing industry structure, this article constructs the following model (see formula (1)):

$$W_{i,t} = \alpha_0 + \alpha_1 OFDI_{i,t} + \alpha_2 X_{i,t} + u_{i,t}, \quad (1)$$

where $W_{i,t}$ refers to the manufacturing industry structure of the i -th province in the t -th year; $OFDI_{i,t}$ refers to the outward direct investment in the manufacturing industry of the i -th province in the t -th year; $X_{i,t}$ refers to the control variables related to the upgrading of manufacturing structure in the i -th province in the t -th year; $u_{i,t}$ refers to the residuals related to the upgrading of the manufacturing industry structure in the i -th province in the t -th year.

Given that the industrial structure of the manufacturing industry is difficult to directly measure, this article measures the dependent variable by multiplying the labor productivity of the manufacturing industry by the proportion of the manufacturing industry to GDP (Yang Dongxu et al., 2020^[6]); For the core explanatory variable OFDI, this article uses the square root of the annual OFDI stock of each province in China to represent it; In addition, this paper sets (1) foreign direct investment (FDI): measured by the natural logarithm of the actual amount of foreign investment; (2) International trade: measured by the natural logarithm of the sum of imports and exports; (3) Inco: measured by the natural logarithm of the actual consumption level of urban and rural residents; (4) Government fiscal expenditure (gov): The ratio of local fiscal expenditure to regional GDP is a six control variable to further investigate how OFDI affects the upgrading of manufacturing structure.

This article investigates the relationship between OFDI and its related economic factors in 31 provincial-level administrative regions in China from 2014 to 2019, and the structure of the manufacturing industry. The data in this article is sourced from the 2014-2019 *China Foreign Direct Investment Statistical Bulletin*, *China Statistical Yearbook*, and other relevant materials.

This article uses an inter provincial panel model to explore the specific impact of China's OFDI and its related factors on the structure of the manufacturing industry. Through the Hausman test, it was found that the random effects (RE) model was better, so the RE model was used to estimate formula (1). The results are shown in columns (1) - (3) of Table 1. As a comparison, column (4) also shows the estimation results of the fixed effects (FE) model. The specific result analysis is shown in Table 1:

Firstly, from the results in column (4), it can be found that the estimation coefficient of the core explanatory variable OFDI is -0.228, which is significant at the 10% statistical level. This result indicates that OFDI has a significant inhibitory effect on the overall upgrading of the manufacturing industry structure. The reason for this

phenomenon may be that a large number of manufacturing enterprises have migrated to areas with lower labor costs, resulting in a decrease in the number of domestic manufacturing enterprises or their main energy and funds being invested in other markets. Local manufacturing cannot obtain high-quality resources and funds, making it difficult to optimize the structure of the local manufacturing industry, and even leading to problems such as industry hollowing out, thereby hindering the structural development of the manufacturing industry.

Secondly, in terms of control variables, it is not significant for both FDI and government fiscal expenditure; For per capita income and international trade, both are only significant in the RE test when fully controlling for variables, with international trade being significantly negative and income being significantly positive. The results show that for FDI, the non significant reason may be that a large number of foreign investment mainly flows into China's labor-intensive enterprises, but the Spillover effect of knowledge, technology and other enterprises is insufficient. In addition, the gradual decline of China's human resources also makes the absorption of foreign investment spillover effects limited, which cannot

significantly promote the upgrading of the manufacturing industry (Yang Dongxu et al., 2020^[6]); The possible reason for the insignificant fiscal expenditure of local governments is that it may make it difficult for market mechanisms to significantly drive the upgrading of manufacturing structure, and it may also have a significant impact on the rational allocation of resources; The improvement of residents' income level can enable them to have more disposable income, which can be converted into more actual purchasing power, thereby promoting the growth of consumption. The growth of consumption can bring about a significant increase in demand, thereby promoting manufacturing enterprises to increase production and adjust industrial structure according to consumer demand, ultimately promoting the optimization of manufacturing structure; The constraints of domestic systems and market deficiencies have magnified the hidden defects in the manufacturing structure against the backdrop of increasing trade scale, resulting in negative impacts on the development of the manufacturing structure.

Table 1 Empirical regression results

		RE		FE
	(1)	(2)	(3)	(4)
<i>OFDI_{i,t}</i>	-0.245*** (0.0617)	-0.158 (0.104)	-0.268* (0.141)	-0.228* (0.129)
<i>FDI_{i,t}</i>		1.863 (3.531)	3.657 (4.012)	1.114 (4.050)
<i>trade_{i,t}</i>		-3.260 (3.049)	-5.275* (3.023)	-2.133 (3.227)
<i>inco_{i,t}</i>			26.07** (12.13)	7.792 (11.67)
<i>gov_{i,t}</i>			4.937 (14.14)	4.685 (12.96)
<i>_cons</i>	38.69*** (5.267)	73.17*** (27.75)	-176.2 (126.8)	-18.91 (119.3)
<i>N</i>	186	186	186	186
<i>R²</i>				0.096

Model significance: * p<0.1, ** p<0.05, *** p<0.01. FE refers to fixed effect panel model, RE refers to random effect panel model as control group.

3. Research conclusions and suggestions

In recent years, China's manufacturing industry has been in a period of structural transformation, and it is crucial to treat OFDI correctly, which will also optimize the upgrading of the manufacturing industry structure. This article reviews relevant literature on the relationship between OFDI and manufacturing structure optimization over the years, analyzes relevant theoretical mechanisms,

and uses a random effects panel model to study relevant data from 31 provinces in China from 2014 to 2019. The main conclusions are as follows: OFDI and international trade related to manufacturing in various provinces of China cannot play a certain role in promoting the upgrading of manufacturing structure, and may even hinder the further development of manufacturing structure; The per capita income level can optimize the industrial structure of the manufacturing industry and promote the transformation and development of the manufacturing industry; Other factors are difficult to have a significant impact on the structural development of the

manufacturing industry. This paper conducts a robustness test on the relevant data, and the results are still valid.

For the government, appropriate and reasonable policy guidance should be adopted for the optimization of the manufacturing industry. In order to prevent manufacturing enterprises from being enthusiastic about OFDI and conducting large-scale industrial relocation, which leads to the problem of hollowing out the industry, the government should formulate certain policies, such as tax exemptions, land use rights transfer incentives, etc., to retain key manufacturing industries and avoid them transferring enterprises to countries or regions with lower costs, better systems, and richer market stocks due to high domestic costs and institutional and market risks. As a result, the industrial structure cannot be upgraded. At the same time, the government cannot ignore the driving effect of improving residents' consumption level on industrial upgrading. The government should create more job opportunities to promote the employment of a large number of labor and obtain more income; The government should also appropriately control the price level to enhance residents' actual purchasing power and force enterprises to improve and innovate their products, thereby having a certain impact on the optimization of the manufacturing industry structure.

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