

OFDI of Chinese Private Enterprises and Deindustrialization

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Abstract

Outward Foreign Direct Investment (OFDI) has a profound impact on the adjustment of industrial structure, and OFDI of Chinese private enterprises is the most important part of OFDI of Chinese enterprises. What is its connection with the deindustrialization process of China's economy? This paper adopts the data of OFDI of Chinese private enterprises as well as the data of China's cities at the prefecture level and above from 2005 to 2016 for empirical analysis, and the results show that OFDI of private enterprises significantly promotes China's deindustrialization process. The results of further heterogeneity test show that compared with greenfield investment, the deindustrialization effect of OFDI of private enterprises in the form of mergers and acquisitions (M&A) is greater; OFDI of private enterprises in the eastern region has the strongest deindustrialization effect, followed by the western region; and compared with OFDI of private enterprises in developing countries, OFDI of private enterprises in developed countries has a stronger negative impact on the level of industrialization. The conclusion of this paper may provide enlightenment for China to promote the new pattern of all-round opening and industrial adjustment and upgrading.

Keywords: outward foreign direct investments; deindustrialization; private enterprises;

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I. Introduction

Industrialization, post-industrialization, deindustrialization and reindustrialization are several stages in the process of industrial development. Based on a contrastive analysis of the industrial development process of various countries in the world, we find: first, most developed countries began to industrialize in the first half of the 19th century, and showed the characteristics of deindustrialization in the 1980s. At that time, the per capita income of these developed countries basically exceeded USD 9,500. Second, the decline in the proportion of the manufacturing employment over the overall employment was the main manifestation of the period of industrialization in developed countries, while another commonly used indicator of the industrialization level - the proportion of value added of manufacturing industry over GDP has declined, but the decline is relatively small, which shows that the labor productivity in the developed countries during the period of industrialization improved⁵. Third, in the late 1990s, some countries in Latin America started the deindustrialization while their per capita income was far lower than USD 9,500. At that time, the manufacturing industry in these countries was still labor intensive and didn't realize the industrial transformation and upgrading. Premature deindustrialization has become a major reason for its fall into the "middle income trap". In 2019, China's per capita disposable income was about USD 4,730⁶, which is much smaller than the per capita income of developed countries when they started deindustrialization. However, by analyzing relevant data, this paper finds that China's economy has shown the characteristics of deindustrialization:

Firstly, the motive force of industrial development is insufficient, and its contribution to economic development declines. Since 2000, China's tertiary industry has developed rapidly, while the secondary industry dominated by manufacturing has slowed down. According to the proportions⁷ of value added of the three major industries from 2000 to 2019 by the National Bureau of Statistics, the proportion of the value added of the tertiary industry in those 20 years had risen steadily. Its proportion has always been higher than that of the secondary industry since the proportion exceeded that of the secondary industry in 2012, and its proportion has been over 50% since 2015. And the proportion of the

5 According to 白雪洁, 于庆瑞. OFDI 是否导致中国 “去工业化”? [J]. 财经论丛, 2019, 11(11):3-11.

6 According to the National Bureau of Statistics, the per capita disposable income of Chinese residents in 2019 was 30,733 yuan, calculated based on the current exchange rate.

7 The proportions of added value of the three industries over GDP were calculated based on the prices of the indicated year.

value added of the secondary industry over GDP presents the downward trend after rising first, and especially in the last decade, the proportion has been declining. Specifically speaking, in 2000, the secondary industry contributed 59.6% to the national economy, while the tertiary industry contributed 36.2%, but in 2019, the tertiary industry contributed 63.5%, playing a dominant role in the national economy. Secondly, the quantity of employees⁸ in the manufacturing sector declines. From 2004 to 2019, the quantity of employees in China's manufacturing industry generally showed a trend of first rising and then declining. The number peaked in 2016, reaching 103.19 million; after 2016, it declined constantly to 97.39 million in 2019. It is worth noting that the proportion of manufacturing employment over total employment declined significantly from 2004 to 2019, especially after 2013.

While China's economy has shown the characteristics of deindustrialization, China's outward foreign direct investment (OFDI) is developing rapidly. In March 2000, during the third session of the Ninth National People's Congress of China, the "going out" strategy was formally put forward, and China's OFDI entered a new stage. With the support of the national strategy, OFDI has become the choice of more and more enterprises. According to the data of the Ministry of Commerce, the OFDI flow of Chinese enterprises increased from USD 21.16 billion in 2006 to USD 196.15 billion in 2016, and the OFDI stock increased from USD 90.63 billion in 2006 to USD 1,357.39 billion in 2016. In 2015, OFDI flow of Chinese enterprises ranked second in the world for the first time, and exceeded Foreign Direct Investment (FDI) attracted in the same year, making a historic breakthrough. According to the data of the National Bureau of Statistics, China's OFDI stock reached USD 2,198.881 billion in 2019, and the net OFDI was USD 136.908 billion. It is worth noting that OFDI of private enterprises is the most important part of OFDI of Chinese enterprises. In the OFDI activities of Chinese enterprises, both the number and proportion of OFDI projects of private enterprises accounted for more than 50% of the total after 2012. In 2019, 71.61% of the OFDI projects of Chinese enterprises came from private enterprises. In terms of the amount of foreign direct investment of Chinese enterprises, the proportion of OFDI in private enterprises exceeded 50% for the first time in 2015 and reached 61.19% in 2016. In 2019, the proportion of OFDI in private enterprises was 53.95%, which was higher than that of state-owned enterprises (44.71%), Hong Kong, Macao and Taiwan-funded enterprises (2.64%) and foreign-funded enterprises (1.43%), are ranked first in the ranking of the investment amount of enterprises with different owner-

⁸ Calculated by summing up the employment data of manufacturing industries of the National Bureau of Statistics.

ships.⁹

Existing studies show that OFDI has a profound impact on the adjustment of industrial structure. As the most important part of OFDI of Chinese enterprises, what impact does OFDI of private enterprises have on China's economic deindustrialization? What are the differences of this impact in different OFDI models, regions and investment flows? To answer these two questions, this paper adopts the data of OFDI of Chinese private enterprises as well as data of Chinese cities at the prefecture level and above from 2005 to 2016 for empirical research.

The remaining contents of this paper are arranged as follows: The second part is literature review, which summarizes the relevant researches of domestic and foreign scholars on OFDI and deindustrialization. The third part is the empirical research, using quantitative method to explore the impact of OFDI of private enterprises on China's economic deindustrialization process. The fourth part is the conclusion and policy suggestions, which gives the research conclusion based on the empirical results, and put forward feasible policy suggestions.

II. Literature Review

(I) Literature Review on the Causes of Deindustrialization

Studies on the causes of deindustrialization are mainly divided into two categories. The first one is the studies on deindustrialization of early industrialized countries such as Europe and the United States, and the second one is the studies on premature deindustrialization of countries with a late start of industrialization such as Latin America and South Africa.

The causes of deindustrialization in developed countries can be summarized as follows: First, changes in demand structure. As per capita disposable income rises, people's demand for commodities of service industry rises while demand for products of manufacturing industry levels off. The consumers tend to be insensitive to the price of commodities of service industry, leading to a decline in the proportion of manufacturing output (Sung, 2011; Clarks, 1957). Second, the difference in productivity between manufacturing and non-manufacturing sectors. The growth rate of productivity in manufacturing industry is usually higher than that of service industry. When the output growth levels of the two sectors are similar, the sector with higher productivity will force out labor, so the propor-

⁹ Data about OFDI of Chinese enterprises in this paragraph were collected from BVD's Zephyr Global M & A database and fdi Markets database.

tion of manufacturing employment will decline (Krugman, 1996; Rowthorn & Ramaswamy, 1999). Third, trade factors. Due to the differences in comparative advantages and stages of industrialization of different countries, trade brings competition and challenges from the international market to the development of domestic manufacturing industry.¹⁰ Import substitution effect and trade deficits will lead to a loss of domestic investment, demand and exports. In addition, the transfer of labor demand from low-skilled workers to high-skilled workers in the developed countries caused by trade is also an important reason for the decline in the proportion of manufacturing employment. (Saeger, 1997; Brady, 2006; Wood, 1995). Fourth, the rise of overseas direct investment. Large-scale OFDI, especially overseas production, forms a substitute for domestic manufacturing production and investment. Bluestone (1988) believes that it is the main reason for the large number of manufacturing plants in the United States. Moreover, the gradual specialization of manufacturing production, the statistical difference caused by part of the jobs originally belonging to the manufacturing sector being included in the service sector, and the high rate of return on investment in service sector such as finance and Internet, can also explain deindustrialization to some extent (Rowthorn, 2004; Hu Lijun, 2013; Tregenna, 2019).

The causes of premature deindustrialization in developing countries¹¹ are different from those in developed economies. The first is policy-induced premature deindustrialization, represented by Mongolia, Latin American countries and some central European countries. Excessive economic liberalization policies, including liberalization of trade and cross-border capital flows, dealt a heavy blow to the development of the countries' manufacturing sectors (Gwynne, 1986; Reinert, 2004; Tregenna, 2016; Nickell, 2010). The second is Dutch Disease-type premature deindustrialization, represented by countries such as South Africa and Colombia. Such countries are usually rich in natural resources, and a great amount of exports of primary commodities have led to capital inflows, forming appreciation pressure on their currencies. The continuous appreciation of local currencies

10 Wood (1994) and Beenstock (1984) believe that globalization and the development of transportation and communication technologies enable developing countries to achieve comparative advantages in low-technology and labor-intensive manufacturing. Thus, the import of similar products has been greatly increased, resulting in the decline of the relative profit margin of similar manufacturing industry and even the whole manufacturing industry in developed countries. Then investment in these industries will either be suppressed (leading to a drop in output and demand for labor) or shifted to innovation in labor-saving technologies (reducing the demand for low-skilled labor).

11 Deindustrialization in low- and middle-income countries is mostly considered premature. Roderick (2016) pointed out that premature deindustrialization occurs when per capita income level is low or has adverse impact on economic growth.

erodes the export competitiveness of the manufacturing sector and eventually leads to the decline of the sector (Dasgupta, 2007; Frenkel & Rapetti, 2012; Andreoni & Tregenna, 2018).

Domestic scholars believe that China's deindustrialization process is mainly affected by the following factors. First, the continuous optimization of industrial structure and adjustment of industrial policy have promoted the elimination of backward production capacity in the manufacturing sector and brought about the rapid development of the service industry (Wei Houkai, 2019). Second, the rapid economic growth and the rise of factor costs brought about by the development of the real estate industry weaken the comparative advantage of China's manufacturing industry (Huang Yongchun, 2013; Wei Houkai, 2019). Third, OFDI in the manufacturing industry leads to sectoral industrial capital outflow, which forms upward pressure on the real interest rate (Liu Haiyun, 2015). In addition, Sino-US trade friction, the rapid development of Internet of Things (IoT), 3D printing, AI and other technologies also restrict the export expansion of China's manufacturing industry (Huang Qunhui, 2020).

(II) Literature Review of OFDI Deindustrialization Effect

Among the current studies on OFDI, studies on deindustrialization mainly include the following: The flying-geese model of Akamatsu (1960), the product cycle theory of Vernon (1966) and the marginal industry expansion theory of Kiyoshi Kojima (1978) explain cross-border investment. They hold that comparative advantage and the change of product cycle promote the transfer of labor-intensive industries or other industries that no longer have comparative advantage through OFDI, thus providing scarce resources and space for the development of other industries in the home country. Studies by Singh (1977), United Nations Industrial Development Organization (1983) and Beenstock (1984) show that OFDI of transnational enterprises is the main cause of job loss in manufacturing industry. Alderson (2015) proposes that OFDI will affect the industrial structure of the home country through currency appreciation and forcing out domestic investment; Ietto-Gillies (1992) believes that OFDI forms deindustrialization by reducing domestic capital. The empirical results of Liu Haiyun (2015) show that the capital-labor ratio in China's manufacturing industry is negatively correlated with OFDI. Shi Liu (2013), Bai Xuejie (2019), and Yang Lili (2018, 2019) use provincial data to conclude that OFDI promotes the process of deindustrialization. Yang Yaping et al. (2016) believe that OFDI had no impact on China's deindustrialization at the micro level.

Throughout the existing literature, it can be seen that foreign scholars have conducted abundant studies on deindustrialization, most of which are conducted in developed coun-

tries or regions such as the United States and Japan, but no unified conclusion has been reached. However, there are relatively few articles on China's OFDI and deindustrialization, most of which are qualitative researches. In addition, scholars mostly chose the data of China's manufacturing industry at the provincial level, and seldom used the data of cities at prefecture level and above, let alone the studies on OFDI of Chinese private enterprises and deindustrialization. China's deindustrialization has its own unique characteristics, and OFDI of private enterprises is the most important part of OFDI of Chinese enterprises, so the study on the relationship between OFDI of Chinese private enterprises and deindustrialization is of great practical significance for China to promote the new pattern of all-round opening and industrial adjustment and upgrading.

III. Empirical Research

This paper selected the relevant data of cities at prefecture level and above in China from 2005 to 2016, including the total industrial output value, gross domestic product (GDP), total profit, total investment in fixed assets, completed investment in real estate development, employees of manufacturing units, employees' wages and actual amount of foreign capital used that year and other indexes. The data are from *China City Statistical Yearbook*, a total of 3453 pieces of data about 298 cities at the prefecture level and above¹² in 31 provincial administrative divisions (mainland China). Data about OFDI of private enterprises come from BVD's Zephyr M&A database and fdi Markets Greenfield database. The number and amount of OFDI projects of private enterprises from 2005 to 2016 are summarized by cities at prefecture level and above and by time. A total of 830 pieces of data¹³ about 185 cities at prefecture level and above of 31 provincial administrative divisions were obtained. Through further integration, this paper finally obtained a total of 803 pieces of data about 171 cities from at the prefecture level and above in 31 provincial administrative divisions from 2005 to 2016. In the empirical study, the fixed-effect regression model for unbalanced panel data and the software stata¹⁵ were employed.

(I) Basic Regression

1. Variable Selection and Model Design

In combination with domestic and foreign scholars' selection of measure indexes for the

¹² The 298 cities at prefecture level and above include renamed, cancelled or newly added cities, specifically 297 existing cities at prefecture-level and above by the end of 2016 and Chaohu City cancelled in July 2011.

¹³ After integration, the sample size decreased from 830 to 803, which was caused by the statistical loss of some cities in the urban statistical yearbook.

deindustrialization level and the definition of industrialization in this paper, this paper planned to select data at manufacturing output level in the empirical data to measure the level of industrialization, but data of manufacturing industry are difficult to obtain, so total industrial output value (calculated based on the prices of the indicated years) of industrial enterprises in the cities at the prefecture level and above were chose as the index to measure the industrialization level; and the amount of OFDI of private enterprises was selected as the variable to measure OFDI of private enterprises. The empirical model is designed as follows:

$$indpro_{it} = \beta_0 of_{it} + \beta_1 profit_{it} + \beta_2 reinv_{it} + \beta_3 gdp_{it} + \beta_4 wage_{it} + \beta_5 fdi_{it} + d_t + u_i + \varepsilon_{it}$$

Here, i stands for the city; T stands for the year; $indpro$ stands for the explained variable - total industrial output value, whose unit is ten thousand yuan, which is used to measure the industrialization level of a city; $ofdim$ stands for the amount of OFDI of private enterprises, whose unit is USD 10,000; d_t stands for the fixed effect of years; u_i stands for fixed effect of the cities, and ε_{it} stands for error term.

The model of this paper selects five control variables: profit stands for the total profit of industrial enterprises in the cities at the prefecture level and above; $reinv$ stands for the amount of completed investment in real estate development in the cities at the prefecture level and above; gdp stands for the gross domestic product of the cities at the prefecture level and above; wage stands for the average wage of employees in the cities at the prefecture level and above, and fdi stands for the amount of foreign capital actually used in the cities at the prefecture level and above that year. Except for fdi whose unit is USD 10,000, the unit of all the variables is ten ten thousand yuan. Total profit and GDP can control the operating environment and circumstances of industrial enterprises in the cities at prefecture level and above. The corresponding factor cost of real estate investment is an important operating cost of an enterprise. The control of workers' wages can control the production cost of enterprises to some extent. Foreign investment has a direct impact on the industrial structure adjustment of the cities at prefecture level and above.

2. Descriptive Statistics and Empirical Method Selection

Table 1 shows the descriptive statistical results of model variables. It can be seen from the table that the data of each variable fluctuate greatly, indicating that there is a great difference in the industrial development level and OFDI of private enterprises in the cities at prefecture level and above in China. According to the data characteristics and research problems, this paper employed the fixed effect model for unbalanced panel data to conduct empirical tests.

Table 1 Descriptive statistics of model variables

Variable	Obs	Mean	Std. Dev.	Max
indpro	803	62700000	61500000	324000000
ofdim	803	52554.37	262380.50	5205582
profit	803	3919037	4426876	33200000
reinv	803	5431873	6648710	42400000
gdp	803	39000000	40200000	282000000
wage	803	4.53	1.81	12.27
fdi	803	207288.80	312375.40	3082563

3. Basic Regression

In this paper, the fixed effect model for unbalanced panel data was employed to analyze the relationship between OFDI of private enterprises and China's deindustrialization process. *Indpro*, industrial output value, is taken as the explained variable to measure

Table 2 Results of basic regression

变量 Variables	(1)	(2)	(3)	(4)	(5)	(6)
ofdim	4.37 (1.41)	-7.76*** (-3.65)	-12.78*** (-6.30)	-21.05*** (-11.52)	-20.35*** (-11.06)	-20.46*** (-11.18)
profit		7.41*** (27.63)	6.05*** (21.46)	3.81*** (13.39)	3.85*** (13.56)	3.75*** (13.19)
reinv			2.02*** (10.20)	-0.46* (-1.94)	-0.42* (-1.75)	-0.53** (-2.21)
gdp				0.85*** (14.89)	0.88*** (15.16)	0.84*** (14.07)
wage					-2535620** (-2.54)	-2407396** (-2.42)
fdi						9.52*** (2.80)
Constant term	13700000*** (3548071.00)	9747607*** (2380218.00)	9143985*** (2204560.00)	4488074** (2.34)	8670762*** (3.44)	8539832*** (3.40)
Fixed effect of cities	✓	✓	✓	✓	✓	✓
Fixed effect of years	✓	✓	✓	✓	✓	✓
Sample size	803	803	803	803	803	803
R square	0.62	0.83	0.85	0.89	0.89	0.89
F value	83.10	229.79	256.35	339.52	321.51	306.41

Note: *** indicates rejection of the null hypothesis at the 1% significance level, ** indicates rejection of the null hypothesis at the 5% significance level, and * indicates rejection of the null hypothesis at the 10% significance level.

the level of industrialization. After controlling the fixed effect of cities and fixed effect of years, variables are gradually added, and the regression results are shown in Table 2.

The results of basic regression show that OFDI of private enterprises has a significant impact on the industrialization level of cities at the prefecture level and above in China. The amount of OFDI of private enterprises has a significant negative impact on the total industrial output value, which is significant at the 1% significance level. When the amount of OFDI of private enterprises increases by USD 10,000, the total industrial output value of the prefecture-level city will decrease by 204,600 yuan. The total profits of industrial enterprises, the GDP and the total amount of foreign capital actually used that year all have a significant positive impact on the total industrial output value, which is significant at the 1% significance level. When the total profits of industrial enterprises increases 10,000 yuan, the total industrial output value of the prefecture-level city will increase by 37,500 yuan. When the amount of foreign capital actually used that year increases by USD 10,000, the total industrial output value of the prefecture-level city will increase by 95,200 yuan. Both the amount of investment in real estate development and the workers' wage have a negative impact on the total industrial output value, and both are significant at the 5% significance level. The R square of model (6) is 0.89, indicating that the model fits well.

(II) Heterogeneity Test

OFDI has two forms: merger and acquisition (M&A) investment and greenfield investment. M&A investment mainly means merging overseas enterprises by purchasing equity or assets. In essence, it is the transfer of control rights and the transaction of property rights between enterprises. Greenfield investment mainly means developing enterprises by making investment to build factories, production and R&D bases in the host country. This paper further sorted out the research data according to different investment forms and divided them into M&A and greenfield groups¹⁴ for heterogeneity test. It can be seen from the empirical test results that there is no essential difference in the impact of M&A and greenfield investment on deindustrialization. Regardless of the form of investment, OFDI of private enterprises has a significantly negative impact on the level of industrialization. In terms of regression coefficient, the negative impact of M&A investment is greater, which may be related to the stronger investment forcing out effect

¹⁴ As the sample data of M&A investment and greenfield investment in prefecture-level cities are overlapping, this paper incorporates them into the same regression for test, so the sample size of heterogeneity test for both M&A group and greenfield investment group is 803. The same method was also adopted for heterogeneity test for developed and developing countries.

Table 3 Results of heterogeneous regression

Variables	M&A	Greenfield	Eastern region	Central region	Western region	Developed countries	Developing countries
ofdim	-24.46*** (-9.12)	-12.87*** (-3.13)	-18.52 *** (-8.78)	0.56 (0.04)	-41.71 (-1.33)	-32.04*** (-9.95)	-15.99** (-2.11)
profit	3.79*** (13.30)	3.79*** (13.30)	3.49 *** (10.29)	4.54*** (7.56)	5.83*** (7.55)	3.98*** (14.07)	3.98*** (14.07)
reinv	-0.47* (-1.93)	-0.47* (-1.93)	-1.40*** (-3.91)	0.79** (2.33)	-0.66 (-1.61)	-0.44* (-1.84)	-0.44* (-1.84)
gdp	0.82*** (13.63)	0.82*** (13.63)	0.87*** (11.81)	0.95*** (6.86)	1.02*** (6.97)	0.87 *** (14.35)	0.87 *** (14.35)
wage	-2343254** (-2.36)	-2343254** (-2.36)	-2440391 (-1.57)	-952261.90 (-0.52)	-1049322 (-1.21)	-2850469*** (-2.87)	-2850469*** (-2.87)
fdi	10.08*** (2.96)	10.08*** (2.96)	14.69 *** (3.59)	-27.39** (-2.40)	-4.98 (-0.80)	6.90** (2.02)	6.90** (2.02)
Constant term	8515551*** (3.39)	8515551*** (3.39)	15600000*** (4.25)	-3819671 (-1.10)	677949.20 (0.14)	9094369 *** (3.63)	9094369 *** (3.63)
Fixed effect of cities	✓	✓	✓	✓	✓	✓	✓
Fixed effect of years	✓	✓	✓	✓	✓	✓	✓
Sample size	803	803	530	185	88	803	803
R square	0.90	0.90	0.89	0.94	0.98	0.89	0.89
F value	290.47	290.47	199.69	108.80	181.55	288.49	288.49

Note: *** indicates rejection of the null hypothesis at the 1% significance level, ** indicates rejection of the null hypothesis at the 5% significance level, and * indicates rejection of the null hypothesis at the 10% significance level.

and industrial chain adjustment effect caused by M&A investment.

There is obvious regional imbalance in China's economic development. Therefore, heterogeneity test is conducted for the impact of OFDI of private enterprises in different regions on deindustrialization. In eastern region, the regression results are basically consistent with the basic regression. OFDI of private enterprises has a significant impact on the local industrialization level. When the amount of OFDI increases by USD 10,000, the industrial added value, the measure index of industrialization level, will decrease by 185, 200 yuan. The total profits of industrial enterprises, GDP and the amount of foreign capital used that year have a significant positive impact on the industrial added value, while the real estate investment has a significant negative impact. OFDI of private enterprises in western region has an impact on the deindustrialization process, but it is not significant, and no such impact was observed in the central region. This may be because the

economic development and industrial transformation and upgrading in eastern region are faster, and private enterprises can choose more OFDI when realizing transformation and upgrading, so that the deindustrialization effect of OFDI of private enterprises is reflected.

Chinese private enterprises prefer to invest in developed economies in their OFDI. Therefore, this paper conducts heterogeneity test for different OFDI target countries of private enterprises. According to the HDI rankings of the Human Development Report 2019 released by the United Nations, countries with the highest level of human development are classified as developed countries, while the rest are developing countries. The regression results in Table 3 show that when the OFDI target countries of private enterprises are developed countries, the regression results are consistent with the basic direction of the basic regression. OFDI of private enterprises has an impact on the industrialization level at the 1% significance level. When the OFDI amount of private enterprises increases by USD 10,000, the total industrial output value will decrease by 320,400 yuan. When the OFDI target countries of private enterprises are developing countries, OFDI also has a significant negative impact on the deindustrialization process, which is significant at the 5% significance level. In terms of regression coefficient, OFDI of private enterprises in developed countries has a greater impact on the level of industrialization, which may be related to the industrial structure difference between developed and developing countries in which OFDI of private enterprises are invested.

(III) Robustness Test

Table 4 shows the regression results of the robustness test. This paper mainly employed three methods to conduct the robustness test, including 1 period lag of explained variables, changing the regression method and changing the measure index of key explanatory variables. When the explained variable GDP was included in regression 1 period lag, the regression results are still significant, and the overall results are basically consistent with the results of basic regression. When the stochastic effect model was employed for empirical test, the results were robust. When the measure index of OFDI of private enterprises was changed from the amount to the quantity of OFDI projects of private enterprises, the regression results are shown in Table 4, which are still robust. It means the quantity of OFDI projects also promoted the deindustrialization process, and the results were significant at the 1% significance level. Therefore, on the whole, the regression model in this paper is robust.

Table 4 Result of robustness regression

Variables	1 period lag	Stochastic effect	Quantity of OFDI projects
ofdim (n)	-17.70*** (-9.49)	-24.64*** (-12.62)	-596066.40*** (-16.27)
profit	2.09*** (6.61)	4.82*** (16.88)	3.58*** (13.71)
reinv	-0.76** (-2.51)	-1.18*** (-5.15)	-0.73*** (-3.30)
gdp	0.94*** (13.04)	1.02*** (18.35)	1.14*** (18.91)
wage	-1453636 (-1.17)	-1229159 (-1.59)	-1936633** (-2.12)
fdi	14.41*** (3.89)	9.64*** (2.75)	2.76 (0.88)
Constant term	5529731 (1.52)	1852615 (0.73)	6053796*** (2.62)
Fixed effect of cities	✓	✓	✓
Fixed effect of years	✓	✓	✓
Sample size	467	803	803
R square	0.91	0.89	0.91
F value	221.09	6460.24 (chi-square)	371.13

Note: *** indicates rejection of the null hypothesis at the 1% significance level, ** indicates rejection of the null hypothesis at the 5% significance level, and * indicates rejection of the null hypothesis at the 10% significance level.

IV. Conclusion and Policy Suggestions

At present, China is in the critical period of economic transformation. The rapid development of tertiary industry and virtual economy has brought unprecedented challenges to the development of traditional manufacturing industry, among which the most prominent challenge is the phenomenon of deindustrialization. On the other hand, OFDI of Chinese enterprises has been booming in recent years, and OFDI of private enterprises is the most important part of OFDI of Chinese enterprises. While OFDI of private enterprises drives the transnational development of private enterprises, is there any internal connection between OFDI and China's deindustrialization process? Therefore, this paper conducted an empirical study on the relationship between OFDI and China's deindustrialization process. This paper selected the data of cities at prefecture level and above in

China from 2005 to 2016, took the total industrial output value as the measure index of industrialization level; and in combination with BVD's Zephyr M&A database and fdi Markets greenfield database, it got the data of OFDI amount of private enterprises from 2005 to 2016. Through further integration, a total of 803 pieces of data of 171 cities at the prefecture level and above in 31 provincial administrative divisions from 2005 to 2016 were obtained. And then the fixed effect model for unbalanced panel data was employed for empirical test, and the regression results show that OFDI of private enterprises has a negative impact on the industrialization level of cities at prefecture-level and above in China, and such impact was significant at the 1% significance level; OFDI of private enterprises in the form of M&A has a greater impact on the level of industrialization; OFDI of private enterprises in the eastern region has the strongest deindustrialization effect, followed by the western region; OFDI of private enterprises in developed countries is more likely to lead to deindustrialization. The robustness test results show that the model is basically robust. Based on the above empirical results, this paper puts forward the following policy suggestions:

Firstly, develop modern manufacturing industry and attach importance to the real economy. The key to preventing and mitigating deindustrialization problems is to promote the healthy development of manufacturing industry itself. The Chinese government should pay more attention to the development of the manufacturing industry, help the traditional manufacturing industry to complete the transformation and upgrading, and prevent premature and excessive deindustrialization. Nowadays, while the virtual economy such as the Internet is booming in China, the real economy should still be the focus of attention, so as to avoid the transition from real economy to virtual economy, promote the smooth transition of industrial structure, and prevent the premature and excessive deindustrialization of domestic economy due to the lack of the support of the real economy.

Secondly, introduce differentiated policies for OFDI of private enterprises in different regions to promote coordinated development of manufacturing industry in different regions. According to the empirical analysis, OFDI of private enterprises in eastern region significantly accelerated deindustrialization, followed by the western region, and the negative impact between the two has not been found in the central region. OFDI of enterprises in eastern China needs effective management and scientific regulation of their industrial layout, and the enterprises should not just carry out resource-seeking OFDI, but strengthen the development of technology-seeking OFDI. The central and western regions should not blindly carry out OFDI without considering the actual situation and de-

mand of their own economic and industrial development, but should promote the coordinated development of manufacturing industry based on the development differences of the central and western regions.

Thirdly, establish and improve the system of OFDI project management of private enterprises, focus on promoting OFDI that is conducive to upgrading of industrial structure, export of excess capacity, and cooperating with overseas high-tech and advanced manufacturing enterprises, limit OFDI in real estate, hotels, cinemas, entertainment and sports clubs and so on, so that OFDI of private enterprises can drive the adjustment and upgrading of domestic industrial structure while promoting China's deindustrialization process, and fundamentally avoid premature and excessive deindustrialization.

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