Can Outward Foreign Direct Investment in Producer Services Alleviate Premature Deindustrialization ?

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Abstract

Deindustrialization is considered as a necessary path for industrial transformation in developed countries. In recent years, deindustrialization has also occurred in developing countries in the process of industrial transformation. However, many developing countries have started deindustrialization prematurely by transitioning to a service economy without experiencing full industrialization, which can negatively affect economic growth and even fall into a middle-income trap. Firstly, this paper analyzes whether there is premature deindustrialization in China. Secondly, it is argued that producer services outward foreign direct investment can promote the productivity improvement of manufacturing through reverse technology spillover effect and market competition effect. Finally, through the transmission path that producer services outward foreign direct investment leads to the increase of labor productivity of industry, and the increase of labor productivity of industry can alleviate the premature deindustrialization, this paper demonstrates the view that producer services outward foreign direct investment can alleviate the premature deindustrialization in China.

**Keywords:** outward foreign direct investment, premature deindustrialization, producer services

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1．Introduction

Since the 1980s, driven by economic globalization, the industrial structure of all regions of the world has changed dramatically, and many developed countries have shifted the pillar industries of their national economies from processing manufacturing to services, i. e., deindustrialization（Qiao Xiaonan and Yang Chenglin, 2013）. In the last decade, China has undergone deindustrialization due to pressures such as rising labor costs while the manufacturing industry has been transforming and upgrading. As can be seen from Figure 1, after 2012, China has shown a significant downward trend in both the share of gross industrial product and the share of industrial employment, indicating that China has experienced deindustrialization after 2012.
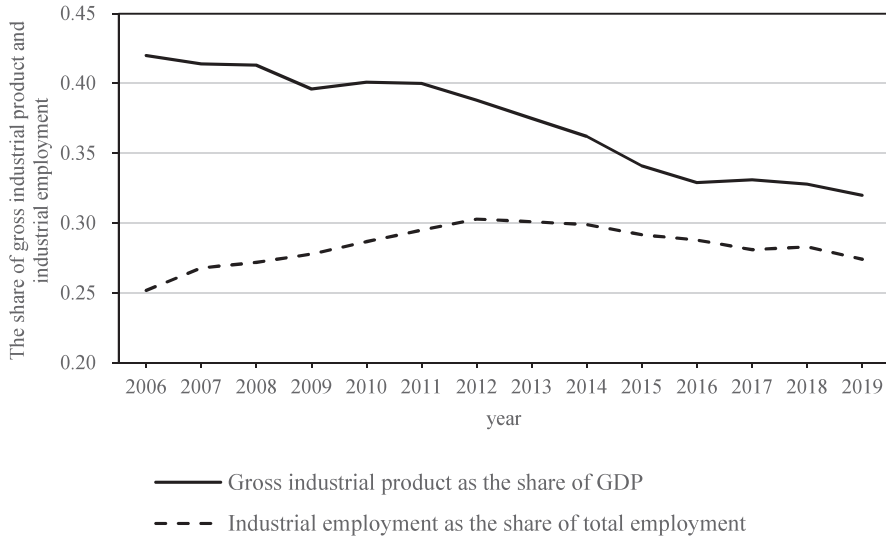

Source: China Statistical Yearbook

Figure 1: Status of gross industrial product as a share of GDP and industrial employment as a share of total employment in China, 2006-2019

As for the causes of deindustrialization, the development of manufacturing in developed countries brought about high income and growth, and then with the increase in income and standard of living, people's demand shifted from manufacturing to services, which led to the deindustrialization of developed countries. This phenomenon conforms to the explanation of "Petty-Clark law". Silva（2019）argues that the decline in the share of manufacturing when the per capita income level reaches the standard of developed coun-

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tries is "typical deindustrialization", while the decline in manufacturing when a country's economy has not yet reached to the level of developed countries is "premature deindustrialization". As for the criteria of developed countries, the World Bank classifies them based on gross national income (GNI) per capita[4], and Figure 2 shows the GNI per capita in China from 1987 to 2019 and the criteria for high-income countries set by the World Bank for each year, and those with GNI per capita above the criteria can be defined as high-income countries. As seen in Figure 2, although China's GNI per capita has grown rapidly since the 20th century, in 2012, when deindustrialization first began, GNI per capita was only 47% of the World Bank's high-income threshold, and even though it reached 82.9% of the high-income threshold in 2019, it still has not reached the income level of developed countries. In addition, the deindustrialization process in developed countries such as the United States relies on advanced technology levels, which has led to a significant increase in labor productivity, coupled with a high level of automation, resulting in a reduction in the number of jobs absorbed, thus causing a considerable number of employees to flow from manufacturing to service (Hu Liansheng, 2016). However, China's manu-
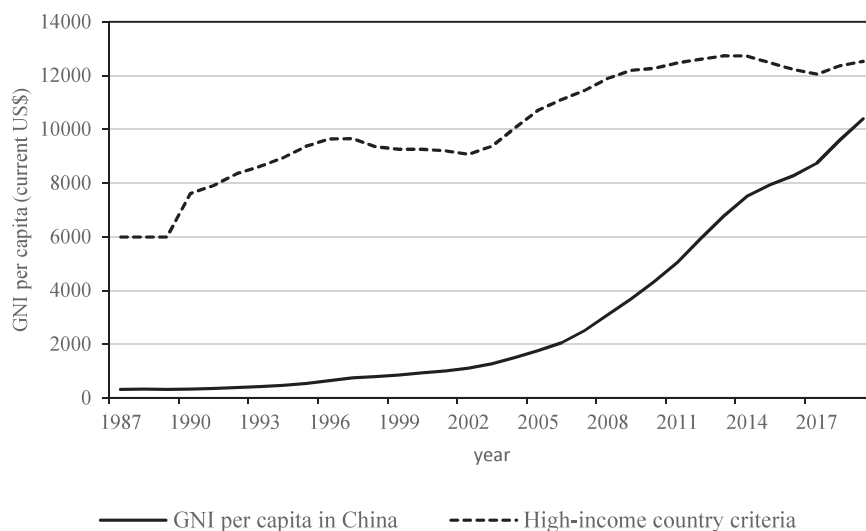
Source: World Bank Database

Figure 2: China's GNI per capita and the World Bank's criteria for high-income level countries

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4   Liu Wei, Cai Zhizhou. How to View that China is Still a Developing Country? [J]. Management World, 2018,34(09):1-15.

facturing technology level still has a lot of room for development, labor productivity is low, and the service sector is not enough to support the national economy, which indicates that China is characterized by "premature deindustrialization". Premature deindustrialization in developing countries such as China will lead to insufficient industrial development, difficulties in economic transformation and upgrading, and even a middle-income trap（Huang Qunhui et al., 2017）.

Regarding the relationship between industrialization and producer services, it is generally accepted in the academic community that the former drives the latter. Manufacturing is the condition and the root of the development of producer services（Klod, 2001）. Without the development of manufacturing, there would be no social demand for these intermediate service industries. Guerrieri and Meliciani（2005）also argue that manufacturing is the most important market demander for producer services. The level of development and competitiveness of producer services in a country is closely related to the manufacturing sector, and a strong industrialization base is conducive to the formation of a modern, internationally competitive, service-oriented economic system. The relationship between producer services and deindustrialization varies due to the different development status of deindustrialization. The "over deindustrialization" in the context of the immature development of advanced manufacturing industries will weaken the market demand space of producer services, and even cause the substitution of foreign producer services for domestic producer services（Wei Houkai, 2019）. Data from the United States show that the "typical deindustrialization" in developed countries will promote the development of producer services. From 1977 to 1981, total employment in the United States grew by 15 percent, while producer services employment grew by 26 percent; between 1981 and 1985, total employment in the United States grew by 8 percent, while producer services employment grew by 20 percent[5].

Scholars have made rich research results in the field of industrialization and deindustrialization, but less literature has studied the relationship between producer services and premature deindustrialization from the perspective of outward foreign direct investment（hereinafter referred to as OFDI）. This paper analyzes whether there is "premature deindustrialization" in China based on producer services, and specifically explains how OFDI in producer services affects manufacturing and China's industrialization process. According to the Statistical Bulletin of China's Outward Foreign Direct Investment 2019, the OFDI flow in China's producer service sector accounted for 71.2% of the total OFDI

5　Saskia-Sassen, The Global City: New York, London, Tokyo, New Jersey［M］. Published by Princeton University Press, 2001, p.131

flow in 2019, and the producer service sector has become a key investment area. With the development of social productivity and international division of labor, the industrial center of gravity of the global economy shows a trend of changing from an industrial economy to a service economy, and there is also a situation of deindustrialization in China. In this context, studying the relationship between OFDI in producer service and deindustrialization is conducive to promoting the optimization and upgrading of industrial structure and realizing the realistic need for the international economic circulation to promote the high-quality development of China's economy. In addition, it also plays a complementary role to the study of OFDI in producer services and premature deindustrialization.

2. Theoretical analysis

This paper will analyze how OFDI in producer services affects deindustrialization at two levels. First, OFDI in producer services can lead to improvements in the technological level and productivity of manufacturing production. Second, the increase in manufacturing productivity can alleviate "premature deindustrialization".

2.1 OFDI in Producer Services and manufacturing productivity improvement

The labor-biased technological advancement in the producer services has a significant promotional effect on the innovation efficiency of manufacturing (Yu Binbin and Wu Dan, 2021), and the agglomeration of producer services exerts economies of scale and technological spillover effects also promote the structural upgrading of manufacturing (Han Feng and Yang Ligao, 2020). In the perspective of the relationship between OFDI and manufacturing, Tao Aiping and Sheng Wei (2018) point out that OFDI reverse technology spillover has a significant positive effect on the high-end of China's manufacturing industry. Zhang Cheng and Zhao Gang (2018) also use provincial data to point out that OFDI significantly contributes to the improvement of the technological level of China's manufacturing industry. And Keller (2000) argues that OFDI investors will have more significant technology spillover effects when developed countries allow OFDI from developing countries to enter core industries and technology R&D; on the contrary, when OFDI cannot absorb the R&D knowledge and technological achievements of the host country, it will drag down the domestic technological level of the investing country to some extent. Pavlinek et al. (2009) find that, due to the limited financial resources of developing countries, increasing OFDI to obtain reverse technology spillovers is inevitably accompanied by a decline in domestic R&D capital investment, and the two offset each other leading to

uncertainty in domestic technological progress. Existing theoretical analyses focus on producer services, OFDI and Promoting manufacturing productivity, but there are few studies that combine the three, and there is controversy about whether OFDI has a catalytic effect on labor productivity or not. This section analyzes the mechanism of the role of OFDI in producer services on manufacturing productivity.

2.1.1 Reverse technology spillover effects of OFDI in producer services

Most producer service industries are technology-intensive and high-end, and their development is naturally supported by technological innovation. Since developing countries started late in this industry and have fewer channels to acquire technology, it has become an inevitable trend to learn advanced technology and absorb high-level human resources and management experience from abroad. When OFDI in producer services enters the technologically advanced developed countries, the technology spillover effect is realized through the absorption of R&D factors, cost-sharing of R&D and technology transfer. The producer services, as an important intermediate input to the manufacturing industry, is closely linked to the manufacturing industry, and the coupling coordination between China's producer services and manufacturing industry has also developed to a good stage （Tang Xiaohua et al., 2018）, so the technological development brought by OFDI in Producer Services will also promote the improvement of manufacturing labor productivity.

2.1.2 Market competition effect

The market competition effect refers to a firm's initiative to increase its own productivity level and maintain its comparative advantage among competitors with similar productivity to its own. When there are competitors in the market, firms will improve their own productivity through R&D innovation to maintain their monopoly position（Aghion, 2009）. China's producer services lags behind developed countries in terms of development and will face challenges from developed countries in the process of outward investment, so increasing productivity levels in the producer services is necessary to gain a foothold in the international market. In the domestic market, Pan Xiongfeng （2016） and Yin Sisi et al. （2020） argue that OFDI will intensify the intensity of competition in the home market, which will also lead to a rise in R&D spending and thus increase productivity. In turn, productivity increases in producer services as an intermediate industry will drive up productivity levels in manufacturing.

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2.2 **Manufacturing labor productivity and premature deindustrialization**

Tregenna（2013）argues that premature deindustrialization can occur when a country's manufacturing sector begins to decline in the economy but its contribution to employment and economic development is lower than international levels. Rodrik（2016）argues that premature deindustrialization is a structural transition to a service economy without a country experiencing full industrialization change. Regarding the negative effects of premature deindustrialization, Li Guomin（2020）argues that premature deindustrialization can lead to reduced gains from manufacturing and weaken economic growth; it can threaten the growth potential of the services sector as an alternative to manufacturing; and it can reduce the level of per capita income at the peak of industrialization.

So why did the premature deindustrialization of developing countries occur? In the early years, some industries in developing countries, particularly labor-intensive low-end manufacturing, had a labor cost advantage, which allowed them to earn relatively large profits. As economies develop and upward pressure on labor costs emerges, profit margins will decline. If the rate of profit is lower than the rate of profit that capital can obtain by other means, then industrialization will be forced to stagnate. The capital that was used to drive industrialization will go into other sectors such as service, leading to the decline of industry, and thus the phenomenon of premature deindustrialization[6]. Dasgupta （2006）argues that developing countries, such as India, should improve the efficiency of manufacturing through information and communication technology to slow down premature deindustrialization and the pathological deindustrialization. Grabowski（2017）shows that inequality in developing countries can also lead to stagnation in manufacturing development and generate premature deindustrialization.

The above analysis points to the root cause of premature deindustrialization in developing countries: the failure to develop technological advantages before the industrial sector loses its comparative advantage in labor costs, resulting in labor productivity remaining at a low level. Therefore, if labor productivity of industry increases, capital will converge on the industrial sector, promoting industrialization and effectively alleviating the problem of premature deindustrialization.

6　Qiao Xiaonan, Yang Chenglin. The Mechanism and Economic Performance of De-industrialization∶A Research of Classified Comparison［J］. China Industrial Economics, 2013（06）:5-17.

３．Characterizing facts

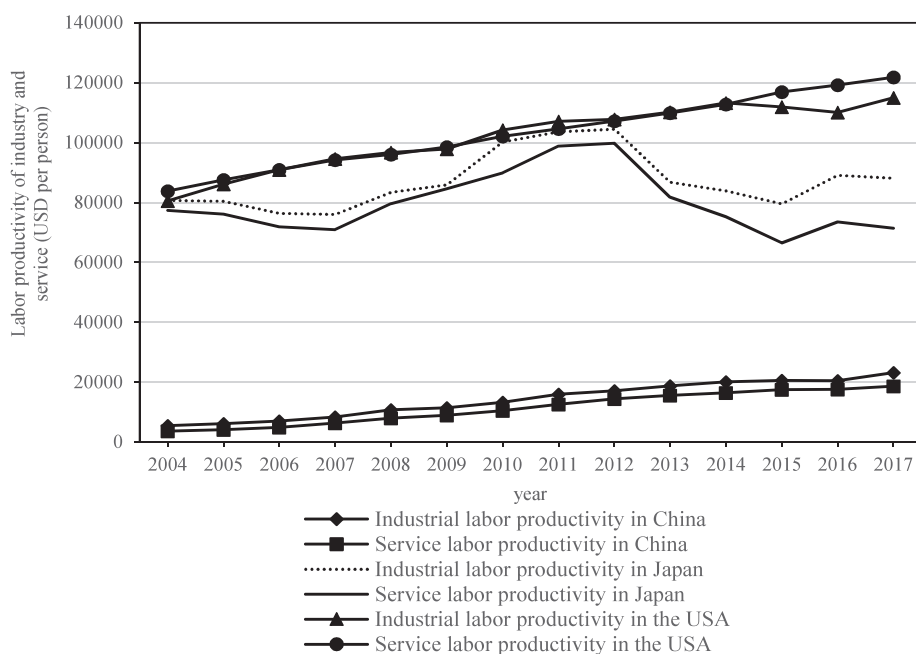### 3.1 Status of China's premature deindustrialization

3.1.1 The metric of premature deindustrialization

The case of whether a country's deindustrialization is "premature" can be defined in two ways. One is whether the country's deindustrialization is based on a background of high labor productivity of industry. If labor productivity of industry is low compared to that of developed countries, then there are still strong prospects for industrial development, and deindustrialization at this time is premature（Wang and Sun, 2017）. The second is whether the ratio of services labor productivity to labor productivity of industry is greater than 1（Qiao Xiaonan and Yang Chenglin, 2013）. When the ratio is greater than 1, it indicates that the labor productivity of service is higher than that of industry in the process of deindustrialization, which means that the transformation of economic structure to services is efficient, this deindustrialization is considered to be a typical deindustrialization; conversely, when the ratio is less than 1, this deindustrialization is considered to be a premature deindustrialization, which does not bring about an increase in overall social efficiency. And the smaller the ratio is, the deeper the premature deindustrialization is considered. Therefore, this paper argues that premature deindustrialization can be defined in terms of the level of labor productivity of industry and the ratio of services labor productivity to labor productivity of industry.

3.1.2 Analysis of the current status of deindustrialization in major developed countries and China

The previous paper analyzed the problem of premature deindustrialization in China from a theoretical point of view, so whether this phenomenon exists in China from an empirical level is further analyzed below using the labor productivity of industry and services in China, the United States and Japan in recent years.

This paper draws on the methodology of Dai Mi（2015）, which uses value added divided by employment to measure the level of labor productivity. In Figure 3, labor productivity of industry is calculated by dividing industrial value added by industrial employment for each country, and labor productivity for services is calculated in the same way. The value added of industry and services used in the calculations are counted in current dollars. As can be seen from Figure 3, the labor productivity of industry and service in the United States was $115,030 per person and $121,817 per person in 2017, with labor productivity levels significantly higher than those of China and Japan; and the level of labor produc-

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Source: Authors' calculations based on data from World Bank database.

Figure 3: **Labor productivity in industrial and service in China, the United States and Ja-
pan,** 2004-2017

tivity in service in the United States was higher than that of industry, indicating that the
deindustrialization of the United States was based on strong service development.

In Japan, which is also a developed country, the labor productivity of industry and
service in 2017 was $88,109 per person and $71,364 per person, which is lower than that of
the United States but still at a relatively high level. However, Japan's labor productivity
of service is lower than labor productivity of industry, which is related to Japan's consis-
tently strong industrial strength and the unusual deindustrialization path in its history.
Japan's deindustrialization process almost coincided with the reindustrialization process
in the United States, which leads to the reindustrialization policy of Japan imitating the
United States showing the "chaotic" characteristic of oscillating between deindustrializa-
tion and reindustrialization[7]. As a result, the focus of Japan's industrial policy oscillated
between the real economy and the service sector.

China's labor productivity in 2017 was $23,191 per person and $18,694 per person for in-
dustry and service. Labor productivity of industry is roughly 20% of the United States

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7　Sun Li. Japan's Policies of "Deindustrialization" and "Reindustrialization" [J]. Japanese Studies, 2018
（06）:49-72.

and 26% of Japan; labor productivity of service is roughly 15% of the United States and 26% of Japan. It is clear that there is a large gap between China's labor productivity and that of developed countries. In addition to that, China's labor productivity of industry has been higher than that of the service, and although the ratio of labor productivity of service to labor productivity of industry shows an upward trend as seen in Figure 4, it remained below 1 with a ratio of 0.8 in 2017. This indicates that the main driving force of China's economic development at this stage is still industry, and the service sector is not yet mature enough to take over the position of industry.
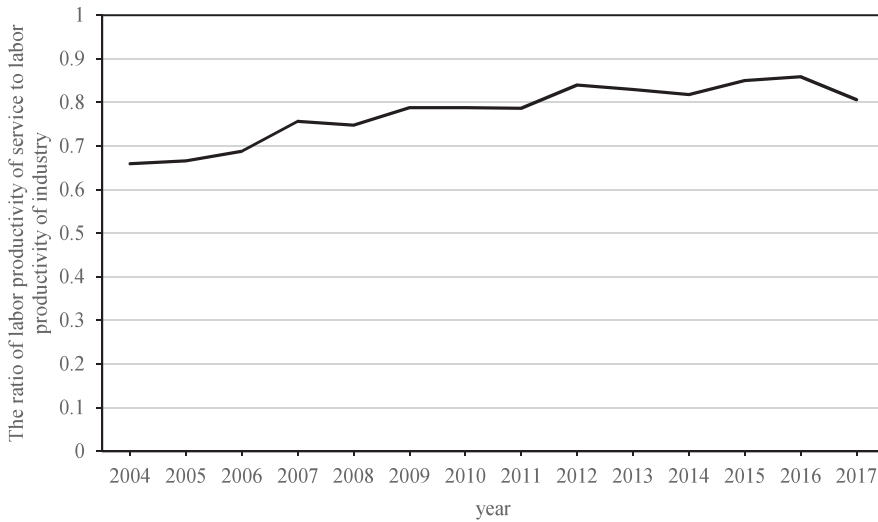

Figure 4: **The ratio of labor productivity of service to labor productivity of industry, China,** 2004-2017

Judging from both labor productivity and the ratio of labor productivity of service to labor productivity of industry, China has shown a tendency to premature deindustrialization.

3.2 **OFDI in producer services and labor productivity of industry**

The sectors included in the producer service studied in this paper, based on Industrial classification for national economic activities and Producer services classification（2015）in the context of the defined scope and data availability, drawing on the classification criteria of Yan Fumei（2018）, the producer service is identified as the following seven sectors:（1）wholesale and retail trade;（2）transportation/storage and postal services;（3）information transmission/software and information technology services;（4）finance;（5）real

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estate; （6）leasing and business services and （7）scientific research and technical services. The data on OFDI in producer services used in this section are obtained from the Statistical Bulletin of China's Outward Foreign Direct Investment, the data on the number of invention patent applications and R&D investment are obtained from the China Statistical Yearbook on Science and Technology, and labor productivity of industry is calculated from the World Bank database data.

In the theoretical analysis, there is a reverse technology spillover effect of OFDI in producer services, while the level of technological innovation can be measured by the number of domestic invention patent applications. The scatter plot on the number of OFDI in producer services and invention patent applications from 2004-2017 is shown below.
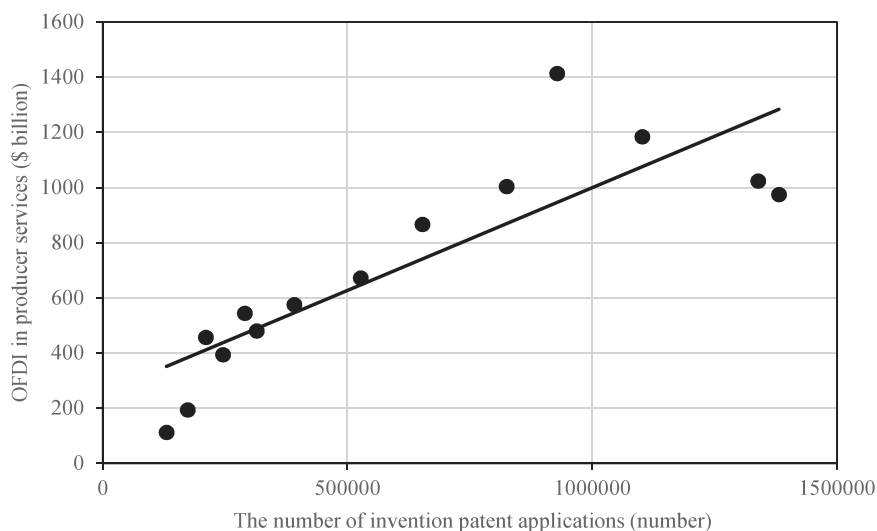

Figure 5: OFDI in producer services and invention patent applications

As shown in Figure 5, there is a significant positive correlation between OFDI in producer services and the number of invention patent applications, which represents the level of technological innovation. To ensure the smoothness of the sample data, the number of invention patent applications is taken as the logarithm for regression analysis, and the regression coefficient is 0.0019, indicating that the number of invention patent applications increases by 0.19% when the OFDI in producer services increases by $100 million. This indicates that OFDI in producer services has a positive effect on technological innovation.

Regarding the analysis of the market competition effect, R&D investment can be used as an indicator of technological innovation. The stronger the market competition is, the

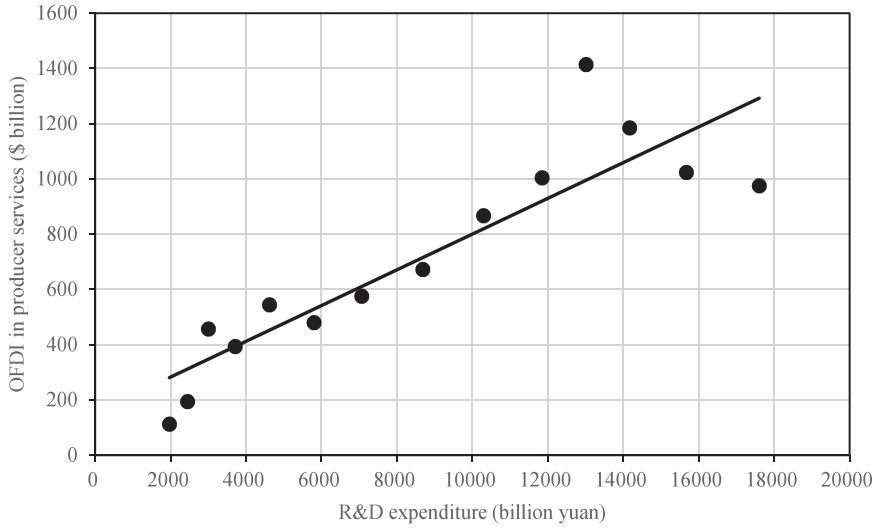more attention the enterprises pay to R&D investment, and the higher the R&D investment will be.

Figure 6: OFDI in producer services and R&D expenditure

There is a significant positive relationship between OFDI in producer services and R&D expenditure, and the regression coefficient of the two is 12.28, indicating that OFDI in producer services has a positive impact on R&D expenditure. The more R&D expenditure, the stronger the ability of enterprises to innovate and the higher the labor productivity.
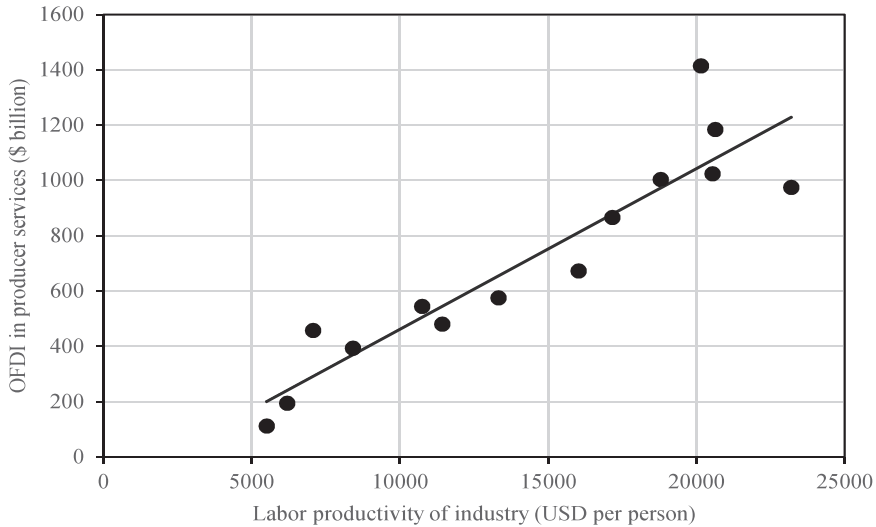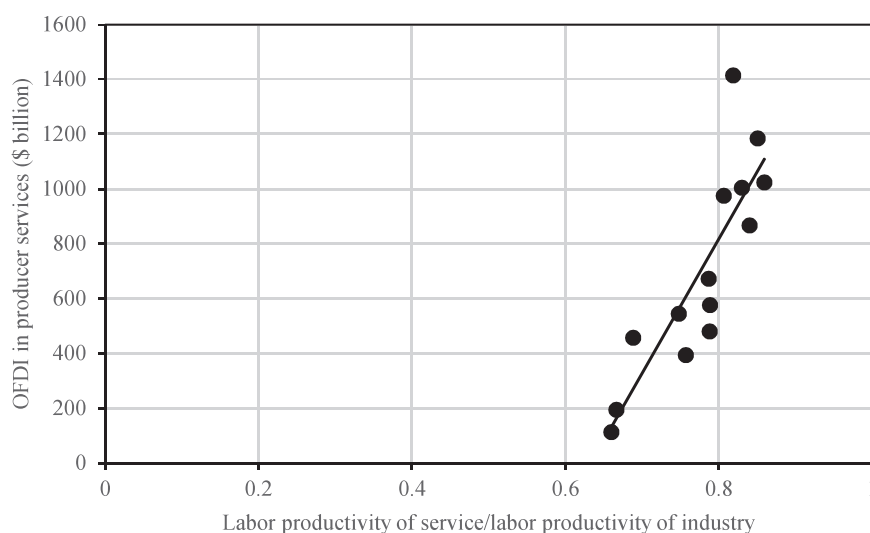

Figure 7: OFDI in Producer services and Labor productivity of industry

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As shown in Figure 7, there is a significant positive correlation between OFDI in producer services and labor productivity of industry. The regression coefficient is 14.65, indicating that labor productivity of industry rises by $\$14.65$ per person for every $\$100$ million increase in OFDI in Producer Services. This is consistent with the theoretical expectation of the reverse technology spillover effect and the market competition effect from producer services in the previous analysis. It can be shown that the growth of OFDI in producer services drives the rise of labor productivity of industry.

3.3 Producer services and industrialization

The previous analysis has concluded that increased labor productivity of industry can effectively alleviate premature deindustrialization. Therefore, the growth of OFDI in producer services can lead to the growth of labor productivity of industry, which can naturally alleviate premature deindustrialization. Next, let us see whether the realistic data is the same as the theoretical analysis.

Source: Authors' calculations based on data from World Bank database and Statistical Bulletin of China's Outward Foreign Direct Investment.

Figure 8: OFDI in producer services and the ratio of labor productivity of service to labor productivity of industry

As shown in Figure 8, there is a significant positive correlation between the OFDI in producer services and ratio of labor productivity of service to labor productivity of industry. Because of the large unit difference between the independent variable and the vari-

able, the OFDI in Producer Services is taken as a logarithm for regression analysis in order to reduce the absolute value of the data. The regression coefficient between the two is 0.0842, indicating that a 1% increase in OFDI in Producer Services increases the ratio of labor productivity of service to labor productivity of industry by 0.0842%. The higher the ratio of labor productivity of service to labor productivity of industry is, the lower the degree of premature deindustrialization is. Therefore, the growth of OFDI in producer services can slow down premature deindustrialization. This also fits perfectly with the previous theoretical analysis.

4．Conclusions and policy recommendations

4.1 Conclusion

This paper investigates the role of the development of OFDI in producer services on China's premature deindustrialization. Firstly, the labor productivity of China, the United States and Japan is compared to analyze whether there is premature deindustrialization in China. Secondly, the relationship between OFDI in producer services and labor productivity of industry in China is analyzed. Finally, whether OFDI in producer services plays an alleviating role in China's premature deindustrialization is analyzed. The main conclusions are as follows:

First, compared with the deindustrialization process in developed countries, China's deindustrialization shows that the labor productivity of industry and service is low, and the labor productivity of service is smaller than that of industry, so it can be judged that China has "premature deindustrialization".

Second, there is a positive correlation between OFDI in producer services and labor productivity of industry in China. This is related to the reverse technology spillover and market competition effects of OFDI in Producer Services on manufacturing. In addition, compared with OFDI in other industries, producer services, as an upstream industry of manufacturing, can directly affect manufacturing productivity.

Third, Chinese OFDI in producer services can alleviate the problem of premature deindustrialization. This is achieved by the transmission path that OFDI in producer services leads to an increase in labor productivity of industry and that an increase in labor productivity of industry can alleviate the problem of premature deindustrialization. As manufacturing productivity increases and profitability strengthens, capital flows to manufacturing will accelerate, pushing forward the deepening of deindustrialization, i.e., alleviating premature deindustrialization.

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4.2 Policy recommendations

First, foreign investment in producer services should be vigorously developed to improve the productivity of the industry. The state and the government should provide financial assistance, enterprises should emphasize scientific and technological research and development in an effort to stimulate independent innovation in the industry. This will increase OFDI in producer services and promote productivity improvements in the manufacturing sector, alleviating China's premature deindustrialization while enhancing the industry's market competitiveness.

Second, in addition to promoting the development of OFDI in producer services, it is also necessary to strengthen the manufacturing industry's own technological upgrading, expand product diversity and industrial chains, maintain the global market competitiveness of China's manufacturing industry, and prevent the share of manufacturing industry from falling prematurely or substantially.

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