International Journal of Business Marketing and Management (IJBMM)
Volume 5 Issue 4 April 2020, P.P. 15-23
ISSN: 2456-4559
www.ijbmm.com

The Impact of Producer Services Agglomeration on Total Factor Productivity

——Based on the perspective of the industry and regional differences

Rui Chen
[1]*University of Chinese Academy of Social Sciences, Beijing, China*

ABSTRACT: *This paper analyzes the impact of high-end and low-end productive service agglomeration on China's urban total factor productivity using panel data from 261 cities in China from 2003 to 2017, and divides the country into three parts: East, Middle, and West Research. The empirical results show that: First, the agglomeration of high-end producer services is conducive to improving urban TFP. In contrast, the agglomeration of low-end producer services has no significant impact on urban TFP. Second, in the East, the agglomeration of high-end and low-end producer services has a positive impact on urban TFP. In the middle of China, the agglomeration of high-end producer services has a positive impact on TFP. In the West, the agglomeration of high-end and low-end producer services has no significant impact on TFP. Based on this, this paper puts forward corresponding suggestions for the development of producer services in various regions of China in order to promote the promotion of urban TFP.*
KEYWORDS: *agglomeration of productive service industries, urban total factor productivity; regional differences*

I. Introduction

The productive service industry characterizes by knowledge and human capital intensive and runs through many production links of industrial production, such as upstream, midstream, and downstream. It is the key "adhesive" for the accelerated integration and mutual promotion of the manufacturing industry and service industry, as well as the power source for the transformation and upgrading of the global industrial chain. In the late 20th century, the proportion of the added value and GDP of producer services in the central member countries of the organization for economic cooperation and development (OECD) was as high as one third, and the employment opportunities brought by the development of producer services far exceeded that of manufacturing. At present, the global economy is developing in the direction of "service-oriented economy," and the productive service activities such as product research and development, financial services, information services, commercial logistics services occupy an increasing share in the industrial value chain.

With the development of communication networks and the progress of information technology, the agglomeration of producer services in space becomes more and more apparent, such as Shanghai Lujiazui financial trade center, Wall Street financial trade center. In some cities of our country, the agglomeration of producer services effectively alleviates resource constraints, promotes specialization, and reduces transaction costs. However, there has always been a problem of unbalanced regional development in China. There are considerable differences in the economic development level among the three regions, i.e., the East, the middle, and the West. The characteristics of producer service agglomeration are high in the East and low in the middle and West. The "agglomeration bonus" of producer service agglomeration can only release in some cities. So for a particular region, to what extent can producer services and its sub-sectors affect the total factor productivity of the city? Based on the characteristics of regional development, how to make a reasonable match between the agglomeration level of producer services and regional development, and better promote the promotion of urban TFP? Deepening the understanding of the above issues is of great theoretical and practical significance for policymakers to formulate reasonable industrial development policies and regional coordinated development strategies.

II. Literature review

The theory of industrial agglomeration has emerged in the period of neoclassical economics. The impact of urban agglomeration economies on productivity was first proposed by Marshall (1890), and has been called the "MAR" externality. It points out that there are three reasons for industrial agglomeration, which are sharing the Labor market, intermediate product inputs, and knowledge spillovers. [1]. Henderson (1998), according to the theory of economic geography, thinks that the fundamental cause of industrial agglomeration lies in geography and economic factors [2]. Krugman (1995) and other representatives of new economic geography examined the causes of industrial agglomeration from the perspective of costs, such as transportation cost and procurement cost [3].

In recent years, with the transformation of the global economy, the "industrial economy" has gradually shifted to the "service industry economy", and Research on industrial agglomeration has gradually shifted to focus on the agglomeration of productive service industries. Earlier articles mainly focused on the Influencing factors (Chen Jianjun et al., 2009; Sheng Long, Lu Genyao, 2013) [4-5], spillover effects of productive services on manufacturing (Gu Naihua, 2011; Xuan Ye, 2012; Yu Yongze et al., 2016) [6-8], The impact of collaborative agglomeration of productive service industry and manufacturing industry (Liu Ye, 2016; Liu Sheng, 2019). [9-10], Research on the relationship between productive service industry and total factor productivity in cities, Han Zenglin et al. (2018) from From a spatial perspective, the impact of the agglomeration of productive service industries on the total factor productivity of the city is considered. There is an "inverted U" relationship between the two [11]. Wu Xianfu (2018) believes that the agglomeration of productive service industries and manufacturing industries and cities. There is a non-linear relationship between total factor productivity. With the increase of the level of industrial agglomeration specialization, the impact of the synergistic agglomeration of the two on urban total factor productivity changes from positive to negative [12].

According to the existing literature, this paper uses panel data of 261 cities in China to establish a measurement model to analyze the impact of productive services and its sub-sectors on the total factor productivity of cities in China and various regions. The main contribution of this article is that it not only considers the agglomeration of the productive service industry but also subdivides its industry into high-end and low-end productive service industries. Determine which regions need to adjust the concentration level of productive service industries in this region, improve the industrial structure, and accelerate the realization of a regional coordinated development strategy.

III. Variable selection and model building

3.1 Variable selection

1) Total factor productivity (TFP)

DEA Malmquist index method used to calculate the TFP, which does not need to consider the price and elasticity coefficient of input factors. It can decompose into urban technological progress (TE) and urban technological efficiency (EC) with the aid of Deap2.1.

Input index: ① labor input. It measured by the number of employees in urban units at the end of the period. ② For capital stock, this paper uses the calculation methods of Zhang Jun et al. (2004) [13], Wang Yiming et al. (2016) [14] for reference, and sets the depreciation rate as 9.6%, to obtain the capital stock data of sample cities. Output index: measure the output level with the real GDP, and use the GDP index to reduce the GDP, which becomes the real GDP Based on 2003.

Before the measurement and estimation, the TFP, TE and EC indexes are transformed, that is, 2003 is set as the base period, and the corresponding TFP level in 2004 is equal to the TFP in 2003 multiplied by the TFP index in 2004, and so on, the TFP level of all cities in 2003-2017 can obtain. The calculation method of TE and EC is the same as that of TFP.

2) Productive service industry cluster (SAGG)

According to the classification of producer services (2019) published by the National Bureau of Statistics, the producer services in this paper include transportation, warehousing, and postal industry, information transmission, computer service, and software industry, financial industry, leasing, and commercial service industry, scientific research, technical service, and geological exploration industry. The producer services divide into high-end and low-end producer services. The former includes information transmission, computer service and software industry, financial industry and scientific research, technical service, and geological exploration industry. In contrast, the latter includes transportation, storage, and postal industry and leasing and commercial

service industry. In this paper, the location entropy method used to calculate the agglomeration index of producer services.

$$SAGG_j = (x_j / y_j) / (x / y) \quad (1)$$

Among them, x_j represents the number of employees in the productive service industry in j city, y_j represents total employment in city j, x represents the number of employees in the productive service industry in all cities in the country, and y indicates the total number of employees in all cities in the country.

3) Control variables

The paper also controls the following control variables that have an impact on urban TFP. First, the industrial structure (STR) measures by the ratio of the added value of the secondary industry and the added value of the tertiary industry. Second, the degree of government intervention (GOV) measures the ratio of public general fiscal budget expenditure to GDP. Third, the level of economic development (PGDP), measured in terms of per capita GDP. Fourth, foreign investment dependence (FDI), measured in the ratio of the actual amount of foreign capital used by the city and GDP in the current year. Fifth, human capital (H), measured by the ratio of the number of students in ordinary institutions of higher learning to the urban population. Sixth, the level of infrastructure (ROAD), measured by the urban per capita road area. Seventh, the population size (POP), the end of the city Measured by the average population.

3.2 Model construction

In order to analyze the impact of producer services agglomeration on TFP, this paper establishes three equations of TFP, TC, and EC.

$$TFP_{it} = \beta_0 + \beta_1 SAGG_{it} + \beta_2 STR_{it} + \beta_3 GOV_{it} + \beta_4 PGDP_{it} + \beta_5 FDI_{it} + \beta_6 H_{it} + \beta_7 ROAD_{it} + v_i + \varepsilon_{it} \quad (2)$$

$$TEit = \beta_0 + \beta_1 SAGG_{it} + \beta_2 STR_{it} + \beta_3 GOV_{it} + \beta_4 PGDP_{it} + \beta_5 FDI_{it} + \beta_6 H_{it} + \beta_7 ROAD_{it} + v_i + \varepsilon_{it} \quad (3)$$

$$ECit = \beta_0 + \beta_1 SAGG_{it} + \beta_2 STR_{it} + \beta_3 GOV_{it} + \beta_4 PGDP_{it} + \beta_5 FDI_{it} + \beta_6 H_{it} + \beta_7 ROAD_{it} + v_i + \varepsilon_{it} \quad (4)$$

Among them, TFP, TE, and EC represent urban total factor productivity, urban technological progress, and urban technological efficiency, respectively, and are the explanatory variables in this article. SAGG represents the level of agglomeration of productive services. STR is the industrial structure; GOV is the degree of government intervention. PGDP is the level of urban development, FDI is the level of foreign investment. H is human capital, and ROAD is the level of infrastructure. v_i is the individual fixation effect ε_{it} represents a random disturbance term that varies with individuals and time.

IV. Measurement inspection and result analysis

4.1 The impact of agglomeration of producer services by the industry on urban productivity

If the explanatory variables of the model have endogenous problems related to the random disturbance term, the estimation results of OLS will be biased. The common cause of endogenous problems is the inverse causality of the model's explanatory variables that also affect the explanatory variables. The improvement of the city's total factor productivity will help to increase the attractiveness of the city, enhance the city's ability to innovate and allow more productive service industries to agglomerate in the city. That is, the city's total factor productivity also has an impact on the agglomeration of productive services. In order to test whether the agglomeration of productive service industries is endogenous, this paper uses the Durbin-Wu-Hausman test and Davidson-MacKinnon test to verify whether the agglomeration variables of productive service industry in the model (2) (3) (4) are endogenous. The results show that the agglomeration of productive services is endogenous in the above models.

Therefore, in order to reduce the endogenous bias of the model estimation results, compared with the traditional OLS estimation and IV estimation, GMM (Generalized method of moments) method is suitable for the case of sequence correlation and heteroscedasticity of random error terms, so this paper uses GMM estimation method to estimate the parameters of the model. In the actual estimation, considering that the current

value of producer services agglomeration is related to the random disturbance. However, its lag period is not related to the disturbance term, and it has a strong correlation with its lag period, so the first and second lag periods of aggregation, low-end, and high-end producer services agglomeration selected as the tool variables. In this paper, 2SLS (two-stage least square) given as a comparison.

Table 1 estimation results of 2SLS and IV-GMM under the national total sample

Variable	2SLS			IV-GMM		
	Total sample	High-end	Low-end	Total sample	High-end	Low-end
SAGG	0.050** (2.56)	0.058*** (4.38)	0.003 (0.24)	0.050*** (2.71)	0.058*** (4.37)	0.001 (0.11)
STR	0.024*** (5.33)	0.024*** (5.35)	0.024*** (5.22)	0.024*** (5.33)	0.024*** (5.38)	0.024*** (5.22)
GOV	-0.093* (-1.93)	-0.095** (-2.01)	-0.090* (-1.90)	-0.093* (-1.94)	-0.094** (-2.00)	-0.089* (-1.88)
PGDP	0.004*** (4.12)	0.004*** (4.15)	0.004*** (4.19)	0.004*** (4.12)	0.004*** (4.15)	0.004*** (4.19)
FDI	-0.250** (-2.08)	-0.245** (-2.10)	-0.243** (-2.08)	-0.250** (-2.08)	-0.246** (-2.11)	-0.243** (-2.07)
H	1.185** (2.34)	1.157** (2.28)	1.158** (2.29)	1.185** (2.34)	1.130** (2.25)	1.142** (2.27)
ROAD	-0.003*** (-3.29)	-0.003*** (-3.38)	-0.003*** (-3.15)	-0.003*** (-3.29)	-0.003*** (-3.36)	-0.003*** (-3.15)
POP	0.129*** (3.10)	0.129*** (3.16)	0.124*** (2.92)	0.129*** (3.10)	0.128*** (3.14)	0.123*** (2.91)
Year	Y	Y	Y	Y	Y	Y
City	Y	Y	Y	Y	Y	Y
(Kleibergen-Paap rk LM statistic	101.265 [0.000]	244.658 [0.000]	101.265 [0.000]	217.220 [0.000]	244.658 [0.000]	101.265 [0.000]
Kleibergen-Paap rk Wald F statistic	133.094	330.248	133.094	287.668	330.248	133.094
Hansen J statistic	0.090 [0.7644]	0.167 [0.6832]	0.090 [0.7644]	0.004 [0.9490]	0.167 [0.6832]	0.090 [0.7644]
N	3393	3393	3393	3393	3393	3393
R^2	0.887	0.888	0.887	0.887	0.888	0.887

Note: 1. The data in parentheses are standard errors, *, * *, *, and * * respectively represent the significance level of 10%, 5%, and 1%; 2. The data in square brackets are the adjoint probability p-value corresponding to LM or F statistics; 3. The regression estimation of instrumental variables adopts the xtivreg2 command in Stata, with the robust standard error of heteroscedasticity, and the variable terms in the regression results do not affect the regression results of the model.

From the regression results in Table 1, the 2SLS estimates and the IV-GMM estimates are the same. When using the instrumental variable method, a series of tests must be performed on the effectiveness of the selected instrumental variables. Table 1 shows the relevant tests result. First, look at the under-identification test. The null hypothesis is that the instrumental variables do not correlate with endogenous variables. The Kleibergen-Paap rk LM statistic has an associated probability of 0.000, which significantly rejects the null

hypothesis, indicating that there is a correlation between instrumental variables and endogenous variables. About the weak instrument variable test again, the null hypothesis is that the model has weak instrument variables. Compare the Kleibergen-Paap rk Wald F statistic with the magnitude of the critical value at the significance level of 10%, and see the value of this statistic in the IV-GMM estimation results They are 287.668, 330.248, and 133.094, which are significantly more significant than the critical value of 19.93 at the significance level of 10%. The null hypothesis strongly rejected, and the selected instrumental variable is useful. Because the number of instrumental variables of the model is higher than the endogenous variables, an over-recognition test is finally performed. The original assumption is that all instrumental variables are exogenous. The concomitant probability values of the Hansen J statistic are all greater than 5% significance level. The null hypothesis, that is, the instrumental variable satisfies the exogenous null hypothesis.

The following analysis is based on the estimation method of IV-GMM. The regression results of the total samples show that the agglomeration of producer services has a positive impact on the city's total factor productivity at a significant level of 1%. The agglomeration level of producer services has increased by 1%, and the city's total factor productivity has increased by 0.05%. From the perspective of the industry type, the high-end producer services agglomeration has a significant positive impact on TFP, with a coefficient of 0.058, which is higher than the impact of total producer services agglomeration on TFP. In contrast, the impact of low-end producer services agglomeration on TFP is not significant. From the perspective of industry segmentation, this conclusion explains the phenomenon that "the agglomeration of producer services has a significant role in promoting urban TFP", that is, the growth of urban TFP in China depends on the agglomeration of high-end producer services. In contrast, the low-end producer services fail to play its role in promoting urban TFP. In order to further improve the level of TFP, we should vigorously support the development of high-end producer services.

In terms of controlling variables, the industrial structure, regional economic development level, human capital, and urban population size have a significant positive impact on the total factor productivity of the city. It indicates that the increase in the growth rate of the total factor of the city cannot achieve without a certain level of industrialization and the level of urban economic development The higher the promotion effect of TFP is, the higher the level of urban human capital is to help the diffusion and dissemination of knowledge, to increase the TFP of the city further. The expansion of the urban population-scale helps to improve the total factor productivity. Government intervention, foreign investment levels, and infrastructure levels have a significant negative impact on the city's total factor productivity. Excessive government intervention damages the fairness and efficiency of market competition, restrains urban TFP, and the "crowding effect" of foreign investment excessively squeezes the survival space of domestic enterprises, which is not suitable for urban TFP. Excessive infrastructure construction reduces investment efficiency, Causing the problem of resource mismatch and inhibiting the increase of urban productivity.

4.2 regional differences of TFP caused by the agglomeration of producer services

This article would like to investigate further the regional differences of productive service agglomeration on the total factor productivity of cities. This paper subdivides 261 cities nationwide into three sample groups of eastern, central, and western, which correspond to 101, 99, and 61 cities, respectively. Then regression on the impact of overall, high-end and low-end productive service industry agglomerations on the total factor productivity of cities in eastern, central and western regions (for space reasons, this article only reports on high-end and low-end productive service industry agglomerations affecting cities). The effect of total factor productivity, the total sample regression results can obtain from the author), still choose the IV-GMM model for parameter estimation.

Table 2 IV-GMM estimation results by region

Variable	East		Central		West	
	High-end	Low-end	High-end	Low-end	High-end	Low-end
SAGG	0.068***	0.027**	0.032*	-0.010	0.044	-0.012
	(5.29)	(2.10)	(1.80)	(-0.98)	(0.69)	(-0.23)
STR	0.015***	0.014**	0.011***	0.011***	0.037***	0.036***
	(2.61)	(2.45)	(3.71)	(3.60)	(4.89)	(4.76)
GOV	-0.036	-0.038	0.125*	0.149**	-0.121*	-0.118*

	(-1.42)	(-1.62)	(1.93)	(2.31)	(-1.94)	(-1.95)
PGDP	-0.002* (-1.88)	-0.002** (-2.16)	0.015*** (6.72)	0.015*** (6.75)	0.010*** (3.37)	0.010*** (3.36)
FDI	-0.379*** (-4.05)	-0.351*** (-3.67)	-0.925*** (-2.97)	-0.888*** (-2.86)	-0.065 (-1.07)	-0.039 (-0.65)
H	-1.270*** (-3.09)	-0.938** (-2.26)	-0.244 (-0.71)	-0.189 (-0.52)	3.438*** (3.14)	3.521*** (3.20)
ROAD	-0.001 (-1.62)	-0.002** (-2.21)	-0.001 (-0.72)	-0.001 (-0.52)	-0.002 (-1.06)	-0.002 (-0.88)
POP	0.042 (0.47)	0.088 (0.97)	-0.094 (-1.56)	-0.127** (-2.16)	0.230*** (3.40)	0.224*** (3.47)
Year	Y	Y	Y	Y	Y	Y
City	Y	Y	Y	Y	Y	Y
(Kleibergen-Paap rk LM statistic	113.429 [0.000]	170.143 [0.000]	148.118 [0.000]	32.239 [0.000]	78.743 [0.000]	59.358 [0.000]
Kleibergen-Paap rk Wald F statistic	161.334	125.331	140.779	47.813	39.461	52.615
Hansen J statistic	3.638 [0.0565]	0.436 [0.5091]	0.234 [0.6288]	0.063 [0.8023]	1.394 [0.2377]	0.017 [0.8976]
N	1313.	1313.	1287	1287	793	793
R^2	0.948	0.943	0.941	0.941	0.779	0.780

As can be seen from Table 2, for the eastern region, the agglomeration of producer service industries in the total sample has a significant promotion effect on urban TFP. Looking at the sample, the agglomeration of high-end and low-end producer service industries has a significant effect on urban total factor productivity. Enhancement. It shows that, for the eastern region, both high-end and low-end producer service industries can significantly promote the improvement of urban productivity. The concentration of high-end productive service industries on urban TFP is obvious, and the agglomeration level of the high-end producer services industry increased by 1%, and urban total factor productivity increased by 0.068%. The eastern region is dominated by coastal cities, with a large urban economy, a sound industrial structure, strong market competitiveness, and a complete industrial chain. The knowledge and technology spillover effects of high-end producer service industries can release in the eastern region. There is also a huge market demand for producer services, and its promotion of urban TFP can bring into play to a certain extent. For the central region, the aggregate agglomeration of the sample producer service industry does not significantly promote the city's total factor productivity. In terms of the sample, the high-end producer service industry agglomeration has a positive impact on urban TFP at a significant level of 10%. The concentration level of producer service industry increased by 1%, the total factor productivity of cities in central regions increased by 0.032%, and the impact of low-end producer service industries on urban TFP was negative, but not significant. The central region is currently playing an important role in undertaking the transformation of the industrial chain in the eastern region. The demand for producer service industries, especially high-end producer service industries, can increase industrial relevance, reduce information costs and transaction costs, and improve the city's overall factor productivity. For the western region, the agglomeration of producer service industries in the total sample has no significant impact on the city's total factor productivity. Looking at the sample, the impact of high-end and low-end producer service industry agglomeration on the city's total factor productivity is not significant, indicating that the regionally, the level of agglomeration of producer services in promoting urban TFP is minimal. The industrial structure in the western region is single and low-level. The potential of manufacturing and production services cannot be effectively released, and it cannot play a role in promoting urban total factor productivity.

4.3 An analysis of the impact of producer services agglomeration on TFP

In order to find out how the agglomeration of producer services affects urban TFP, this paper divides TFP into TE and EC, and uses IV-GMM model to test the internal path of TFP. The results show in Table 3.

Table 3 Path analysis of the agglomeration of productive service industries affecting the city's total factor productivity

Variable	TE			EC		
	Total sample	High-end	Low-end	Total sample	High-end	Low-end
SAGG	0.034*** (4.29)	0.026*** (4.74)	0.014** (2.58)	0.114*** (4.03)	0.102*** (5.43)	0.026 (1.22)
STR	0.006** (2.17)	0.006** (2.01)	0.006** (2.21)	0.017** (2.21)	0.016** (2.10)	0.015** (2.03)
GOV	0.010 (0.66)	0.009 (0.63)	0.011 (0.78)	-0.207** (-2.56)	-0.207*** (-2.59)	-0.201** (-2.51)
PGDP	-0.001** (-2.19)	-0.001** (-2.12)	-0.001** (-2.13)	0.015*** (8.28)	0.015*** (8.37)	0.016*** (8.32)
FDI	0.038 (1.28)	0.042 (1.35)	0.039 (1.28)	-0.325*** (-2.71)	-0.323*** (2.85)	-0.310*** (-2.68)
H	0.225 (1.11)	0.228 (1.14)	0.227 (1.13)	1.556*** (2.60)	1.428** (2.39)	1.531*** (2.58)
ROAD	-0.0004 (-0.98)	-0.0003 (-0.78)	-0.0004 (-1.00)	-0.006*** (-5.10)	-0.006*** (-5.09)	-0.007*** (-5.07)
POP	0.030** (2.09)	0.029** (2.00)	0.029* (1.92)	0.135** (2.51)	0.131** (2.47)	0.128** (2.35)
Year	Y	Y	Y	Y	Y	Y
City	Y	Y	Y	Y	Y	Y
(Kleibergen-Paap rk LM statistic	217.220 [0.000]	244.658 [0.000]	101.265 [0.000]	217.220 [0.000]	244.658 [0.000]	101.265 [0.000]
Kleibergen-Paap rk Wald F statistic	287.668	330.248	133.094	287.668	330.248	133.094
Hansen J statistic	0.047 [0.8284]	1.058 [0.3037]	0.076 [0.7834]	0.948 [0.3302]	1.112 [0.2915]	0.176 [0.6748]
N	3393	3393	3393	3393	3393	3393
R^2	0.985	0.985	0.985	0.162	0.164	0.153

From the perspective of how agglomeration of productive service industries affects urban technological progress, the agglomeration of productive service industries in the total sample has a significant positive impact on urban technological progress. The level of agglomeration of productive service industries has increased by 1%, and urban technological progress has increased by 0.034%. According to the sample, the agglomeration of high-end and low-end productive service industries can promote urban technological progress, and the promotion of agglomeration of high-end productive service industries is stronger than the low-end productive service industries. The agglomeration of high-end productive service industries directly forms new knowledge,

new inventions, and new skills, and low-end productive service industries can reduce transaction costs for knowledge spillovers, both of which can promote urban technological progress. The industrial structure and population size have a significant positive impact on urban technological progress. The improvement of urban technological progress is inseparable from the development of manufacturing and a certain urban size. The level of urban development harms urban technological progress. Cities may overlook the importance of improving urban technological progress, leading to inefficient allocation of resources and inhibiting the upgrading of urban technological progress.

From the perspective of the impact of productive service industry agglomeration on urban technological efficiency, the aggregate sample productive service industry agglomeration has a positive impact on urban technological efficiency at a significance level of 1%, and the productive service industry agglomeration level has increased by 1%. Urban technological efficiency Increased by 0.114%. According to the sample, the agglomeration of high-end productive service industries can promote the technological efficiency of cities, and the agglomeration of low-end productive service industries has no significant effect on urban technological efficiency. The high-end productive service industry has a very high correlation between front and back and has played a very significant role in promoting urban technological upgrading. The industrial structure, regional development level, human capital, and population size all have significant positive effects on urban technological efficiency. The improvement of urban technological efficiency and industrialization level, regional development, human capital knowledge, and technology spillovers, and specific population size have a very close connection. The degree of government intervention, foreign investment level, and infrastructure level hurt urban technological efficiency. Excessive government intervention has led to resource mismatches. Excessive crowding-out effects of foreign direct investment will inhibit urban technological efficiency. At the same time, the level of infrastructure Excessive heavy investment development model harms urban technological efficiency.

V. Research conclusions and policy recommendations

This article uses panel data from 261 cities in China from 2003 to 2017 to analyze the impact of agglomeration of productive services on urban total factor productivity. It analyzes from the perspective of the industry and regional classification, that is, to divide China into three regions: East, middle, and West. In this paper, we study the impact of the total sample, high-end and low-end productive service industry clusters on the total factor productivity of the three regions, and finally examine the impact path of the productive service industry and its sub-sectors on the city's total factor productivity. This paper has obtained the following research conclusions: (1) the total sample and the agglomeration of high-end productive service industries have a significant promotion effect on urban total factor productivity, and the impact of agglomeration of low-end productive service industries is not obvious. (2) Inthe East, the agglomeration of high-end and low-end productive service industries is conducive to improving the city's total factor productivity. For the central region, the concentration of high-end productive service industries is positively affecting the city's total factor productivity and low-end productive services. Industry agglomeration has no visible promotion effect on urban total factor productivity. For the western region, the agglomeration of high-end and low-end productive service industries has no significant impact on urban total factor productivity. (3) From the perspective of the internal impact path, high-end, and low-end, The agglomeration of productive service industries is conducive to the improvement of urban technological progress. The agglomeration of high-end productive service industries can promote the technological efficiency of cities, while the agglomeration of low-end productive service industries has no significant impact on urban technological efficiency.

According to the research conclusions of this paper, I propose the following policy recommendations: First, accelerate the development of the productive service industry towards high-end, quality and intensive development, vigorously promote the concentration of high-end productive service industries, and lead the industry chain towards the high-end of the value chain. Transfer to fully release the role of high-end productive services in improving urban total factor productivity, urban technological progress, and urban technological efficiency. Second, for the eastern and central regions, while adjusting and optimizing the industrial structure. The actual needs of the development of the manufacturing industry, formulate effective industrial policies and promote the coordinated agglomeration and optimized development of high-end productive service industries such as development services, financial services, business services, and information services. For the central region, undertaking manufacturing in the eastern region At the same time, with the integration of high-end productive service industries and manufacturing industries, it is necessary to help traditional manufacturing industries achieve transformation and upgrading. At the same time, it is necessary to rationally and orderly develop low-end productive services so that high- and low-end productive service industries can match. Coordinated development; for the western region, due to the single industrial structure, The overall scale

manufacturing and services is too low, should accelerate the upgrading of the level of concentration of producer services, producer services play a catalytic role in urban agglomeration TFP.

Reference

[1]. Henderson, J. V. (1998) Urban Development Theory,Fact and Illusion, Oxford University press.

[2]. Marshall,A.(1920) Principles of Economics, Macmillan press.

[3]. Krugman, P. (1991) Geography and Trade, MIT Press.

[4]. Chen, J.J., Chen G.L. (2009) Huang J. Agglomeration of producer services and its influencing factors in the perspective of new economic geography: Empirical Evidence from 222 cities in China. *Management world, 04*, 83-95.

[5]. Sheng L., Lu G.Y. (2013) A study on the agglomeration of producer services in China and its influencing factors based on the analysis of industry and region [J]. *Nankai economic research, 05*, 115-129.

[6]. Gu N.H. (2011) The spillover effect of China's Urban Producer Services Agglomeration on industry and its regional boundary: An Empirical Study Based on HLM model. *Finance and trade economy, 05*, 115-122.

[7]. Xuan X. (2012) Spatial agglomeration of manufacturing service industry and improvement of manufacturing efficiency: an empirical study based on space spillover effects. *Finance and Economics, 04*, 121-128.

[8]. Yu Y.Z., Liu D.Y., Xuan Y. (2016) Spillover Effect of Producer Service Industry Convergence on Manufacturing Production Efficiency and Its Decline Boundary——An Empirical Analysis Based on Spatial Econometric Model. *Financial Research, 02*, 23-36.

[9]. Han Z.L., Yang W.Y., Guo J.K. (2018) The Impact of China's Productive Service Industry Agglomeration on Urban Total Factor Productivity from a Supply-side Perspective .*Journal of Capital University of Economics and Business, 20*, 72-82.

[10]. Liu Y., Liu B.F. (2016) The Impact of Synergetic Agglomeration of Productive Services and Manufacturing Industry on Manufacturing Efficiency: An Empirical Study Based on Panel Data of Chinese Urban Agglomerations. *Economic Management, 06*,16-38.

[11]. Liu S., Li W.X., Chen X.Y. (2019) The Impact of Synergetic Agglomeration of Productive Service Industry and Manufacturing Industry on Enterprise Innovation. *Journal of Guangdong University of Finance and Economics,34*, 43-53.

[12]. Wu X.F. (2018) Does the synergistic agglomeration of productive service industry an manufacturing industry improve total factor productivity? *Economics and Trade Forum, 12*,13-20.

[13]. Zhang J., Zhang Y. (2003) Re-estimation of China's capital stock K. *Economic Research, 07*, 35-43.

[14]. Wang Y.M., Chen C., Gao S.H. (2016) Estimation and Analysis of Total Factor Productivity in Chinese Cities. *Economic Issues*, 8,1-8.