The Impact of Financial Agglomeration on the Upgrading of Industrial Structure

-- Taking Guangdong Province as an Example

Jingwen Xia[1] and Chunrong Wu[2, a, *]

[1]School of economics, Jinan University, Guangzhou, 510632, China.

[2]School of economics, Jinan University, Guangzhou, 510632, China.

[a]Corresponding author e-mail: honeyysp@163.com

Abstract

By describing the current status of the concentration of financial industry in Guangdong Province, this paper concludes that Guangdong's financial industry and bank, insurance, and shadow bank industries have obvious spatial agglomeration characteristics. Using the panel data of 21 prefecture-level cities in Guangdong Province from 2005 to 2018, a spatial Dubin (SDM) model is established, and the relationship between financial agglomeration and industrial structure upgrading is empirically tested under three spatial weight matrices, and conclusions are drawn: First, financial agglomeration and industrial structure upgrading have obvious spatial dependence, and financial agglomeration has a significant promotion effect on industrial structure upgrade. Second, there is a significant space spillover effect in the upgrading of the industrial structure. The upgrading of the industrial structure in the surrounding areas will promote the upgrading of the industrial structure in the region.

Keywords

Financial Agglomeration, Industrial Structural Upgrade, Space Measurement, Space spillover effect.

1. INTRODUCTION

Finance is the core of modern economy, so further elaborated in the nineteenth party in the report, the process of modern economic development, finance has always occupied a central position, while the development of China's economy is currently facing the problem of insufficient imbalances, need to rely on financial development to solve. To address this series of problems in the financial sector need to further deepen the financial system, enhance the ability of the real economy, financial services, and promote the healthy development of capital markets. This requires as a modern economic core of the financial industry to achieve more efficient allocation of financial resources, the rapid development of a multi-level capital market, establish a sound financial regulatory system, promote balanced regional economic development.

Guangdong is the first big economic province of China, the province's foreign trade, but also the financial province, the CPC Guangdong Provincial Committee in December 2003 formally proposed to "improve the financial system, the construction of Guangdong province finance" an important measure. In recent years, accelerate the construction of Guangdong province's financial, deepen financial reform, and actively enhance the ability of the real economy, financial services, financial management mechanism has been improved, Guangdong Province, the financial industry has made great progress, it has become an important driver of economic

development support. The size of the financial sector continued to expand in Guangdong Province, has become increasingly prominent financial agglomeration effect, it has been formed to gather the Guangzhou-Shenzhen financial center dual zone, the rest of the Pearl River Delta region for the support of non-financial bead concentration diffusion region as an important force point situation. Further study the use of existing strengths to strengthen the financial agglomeration level, to promote the real economy, financial services, promote the Guangzhou perfect modern financial service system, accelerate the transformation from Guangdong province to finance large financial province, which all need financial cluster is how to promote industry upgrading theoretical and empirical testing to support. Therefore, the study whether the level of the current financial gathering to promote the industrial structure transformation and upgrading of Guangdong Province, as well as how to further enhance the level of concentration of financial and industrial upgrading service to make it become the focus of this paper.

2. LITERATURE REVIEW

Academia to define the upgrading of industrial structure and industrial upgrading has a different view, so the impact on the financial cluster upgrading the industrial structure are manifold. Domestic and foreign scholars research on financial agglomeration and upgrading of industrial structure can be divided into two categories, one is the study of the theory of financial agglomeration and upgrading of industrial structure, whether one is in favor of financial agglomeration of industrial structure upgrading empirical analysis.

Foreign scholars started research on the relationship between financial agglomeration and industrial structure upgrade before domestic scholars. Da Rin and Hellman's research found that banks play a financial intermediary role to guide the flow of funds, thereby making it easier for emerging industries to obtain funds and speed up than sunset industries. Change of industries, optimize the industrial structure. Aghion analyzed the financial and industrial data of multiple countries and found that financial development ultimately affects a country's output and industrial structure by promoting capital accumulation and technological innovation in enterprises. Carlin and Mayer conducted correlation research on the financial system, economic growth and investment, and industrial structure of OECD countries from 1970 to 1995. The study found that there was a significant correlation between them.

A small number of scholars have studied the relationship between financial industry agglomeration and industrial structure audit in Guangdong Province. Pinghai Li and Xue Wang

(2009) used factor analysis to measure the level of financial agglomeration in Guangdong Province from 1985 to 207. The province's relationship between financial agglomeration and industrial upgrading was empirically tested. The results show that financial agglomeration, through its unique economic effects, has broadened investment and financing channels, improved capital supply levels and allocation efficiency, and promoted regional industrial structure optimization and upgrading. Wenfeng Zhao (2016) used spatial econometric analysis technology to build a panel model for empirical analysis with the city-level data from 2000 to 2014 in Guangdong Province, and found that financial agglomeration and industrial structure upgrade have obvious spatial dependence, and the degree of dependence continues to increase over time Deepening; financial agglomeration can significantly promote the upgrading of the industrial structure, and carry out subdivision studies by different industries. The promotion effect of the banking agglomeration on the upgrading of the industrial structure is significantly greater than that of the insurance industry. Weijie Zhou (2019) used the financial agglomeration of the Guangdong-Hong Kong-Macao Greater Bay Area as a research object, using the location entropy index and the Moran index to measure the degree and spatial correlation of financial agglomeration in the Guangdong-Hong Kong-Macao Greater Bay area, and compared and

analyzed the industries in the Guangdong-Hong Kong-Macao Greater Bay Area. The similarities and differences between industrial clusters and internationally renowned bay area industrial clusters show that financial agglomeration exists in the Guangdong-Hong Kong-Macao Greater Bay Area.

The research by the above scholars shows to a certain extent that Guangdong Province has shown a very strong trend of financial agglomeration, and financial agglomeration can affect the process of upgrading the industrial structure. However, previous studies have more or less problems, or focused research perspectives. At the provincial level, or only studying the nine cities in the Pearl River Delta, and some studies lack the study of the relationship between the sub-industry agglomeration of the financial industry and the upgrading of the industrial structure, the spatial lag model or spatial error model adopted because it ignores explanatory variables The Spatial econometric analysis makes the empirical results less convincing. Therefore, based on the analysis of previous studies, this paper analyzes the Spatial econometric analysis of 21 prefecture-level cities in Guangdong province through spatial econometric analysis methods, and establishes a spatial Dubin model by establishing city-level panel data from 2005 to 2018. The effects of financial agglomeration and banking, insurance, and shadow banking agglomeration on the upgrading of industrial structure are empirically tested. The research in this paper can make up for the deficiencies of previous studies to a certain extent.

3. METHODOLOGY

3.1. Variable

This paper draws on the methods of Deyun Xu (2008) and Xiaoyan Zhang, Guanghe Ran (2015), etc., and uses the industrial structure upgrade coefficient (CY) as a measurement index to measure the level of regional industrial structure upgrade. The calculation method is as follows:

$$CY = y_1 \times 1 + y_2 \times 2 + y_3 \times 3$$

Where CY represents the upgrading factor of the industrial structure, y1, y2, y3 respectively represent the proportion of the added value of the first, second, and third industries to the regional GDP. The value range of CY is (1, 3). Its economic meaning can be understood as if the industrial structure of a region is relatively high. Level, the proportion of the tertiary industry's added value to the regional GDP will be higher, so the value of the industrial structure upgrade coefficient will be larger, and vice versa.

Considering that the availability of data and the relative concentration can better reflect the degree of regional industrial agglomeration, this paper draws on the opinions of most scholars and uses location entropy to measure regional financial agglomeration levels. As far as an industry in a region is concerned, the judgment of its degree of agglomeration should be based on the comparison of the measured industrial location entropy with the size of 1. When the location entropy value of the industry is greater than 1, it indicates that the industry's agglomeration situation is more significant. When the industry's location entropy value is less than 1, it indicates that the industry's agglomeration situation is not significant. The specific calculation method of location entropy is:

$$\gamma_{ij} = \frac{X_{ij} \div X_i}{Y_{kj} \div Y_k}$$

3.2. Model Setting

Based on the above analysis, the following models can be established:

$$CY_{it} = C_t + \alpha Fn_{it} + \beta_1 Gov_{it} + \beta_2 Inv_{it} + \beta_3 FDI_{it} + \beta_4 RD_{it} + \beta_5 Open_{it} + \varepsilon_{it}$$

Among them, CY represents the upgrading coefficient of industrial structure, Fn represents the entropy value of regional financial agglomeration, Gov represents government expenditure, Invest represents the whole society's fixed asset investment, FDI represents foreign direct investment, RD represents research investment, and Open represents foreign trade dependence. i = 1,2,3 …, 21 represents 21 cities above the prefecture level included in the sample data, and t represents time.

This paper uses the spatial Dubin model for empirical analysis, and brings the financial industry and its subdivided industry indicators into the spatial Dubin model to obtain the following regression models:

Model (1): Only the entropy variables and control variables of the financial agglomeration location are added to the model to test the effect of the overall financial agglomeration on the upgrading of industrial structure. The specific model settings are as follows:

$$CY_{it} = C_t + \alpha Fn_{it} + \beta Control_{it} + \delta_1 WCY_{it} + \delta_2 WFn_{it} + \delta_3 WControl_{it} + \varepsilon_{it}$$

Wherein CY represents industrial upgrading coefficient, Fn denotes Financial Cluster location entropy, Control represents control variables, δ is a spatial lag factor, W is the space right n × n weight matrix, α and β are reflected explanatory variables and the control variables for the industry Effect of upgrading, ε denotes a random error term.

Model (2) - (4): in the model were added separately three financial sub-sectors, namely banking, insurance and banking shadow location entropy and control variables regression, the specific model set as follows:

$$CY_{it} = C_t + \alpha X_{it} + \beta Control_{it} + \delta_1 WCY_{it} + \delta_2 WX_{it} + \delta_3 WControl_{it} + \varepsilon_{it}$$

$$x_{it} \sim (Bank_{it} \text{ t}, \ Insure_{it}, \ SH_{it})$$

Model (5): In the model, a one-time addition of three financial sub-sector gathering location quotient and control variables, the specific model set as follows:

$$CY_{it} = C_t + \alpha_1 Bank_{it} + \alpha_2 Insure_{it} + \alpha_3 SH_{it} + \beta Control_{it} + \delta_1 WCY_{it} + \delta_2 WBank_{it}$$

$$+ \delta_3 WInsure_{it} + \delta_4 WSH_{it} + \delta_5 WControl_{it} + \varepsilon_{it}$$

4. RESULTS AND DISCUSSION

4.1. Spatial Auto-correlation Test

An empirical regression analysis of the industrial structure upgrading problem using a spatial econometric model, the first problem to be solved is whether the regional industrial structure upgrading coefficient has spatial auto-correlation. The spatial auto-correlation test is to verify whether there are similar variable values in adjacent areas by constructing indicators, thereby forming an agglomeration effect in space. If it is a similar attribute indicator, it is a spatial positive correlation; otherwise, it is a spatial negative correlation. Random distribution, there are no spatial effects or weak spatial effects. This article uses the mainstream Moran 's I index for testing, and the calculation formula is as follows:

$$Moran's \ I = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij}(x_i - \bar{x})(x_j - \bar{x})}{S^2 \sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij}}$$

$$S^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}, \quad \bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

w_{ij} is the spatial weight matrix for measuring the distance between the i and j regions, x_i and x_j Care the variables of the i and j regions, and n is the total number of individuals studied in this paper (a total of 21 cities above the prefecture level). The value range of this index is (-1,1). If the significance test is passed, Moran's I> 0 means the variable has a positive spatial correlation, Moran's I <0 means the variable has a negative spatial correlation, and Moran's I = 0 Indicates that the variable has no spatial correlation, and the larger the absolute value of the variable, the stronger the spatial correlation.

Table 1. Moran 's I Index

year	CY	FN	BANK	INSURE	SH
2007	0.409***	0.074***	0.141***	0.165***	0.170***
2008	0.419***	0.056**	0.164***	0.207**	0.195***
2009	0.379***	0.087***	0.204***	0.261***	0.235***
2010	0.395***	0.105***	0.153**	0.296***	0.184**
2011	0.345***	0.062***	0.164***	0.210***	0.208***
2012	0.420***	0.083***	0.195***	0.232**	0.240***
2013	0.401***	0.094***	0.216***	0.226***	0.210**
2014	0.410***	0.119**	0.226***	0.261***	0.218***
2015	0.417***	0.113***	0.190**	0.076***	0.177***
2016	0.392***	0.150**	0.197*	0.280***	0.189**
2017	0.376***	0.152***	0.171***	0.357***	0.169***
2018	0.364***	0.171***	0.153**	0.310***	0.147***

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

From the data in the table, it can be seen that the Moran's I index of the industrial structure upgrade coefficients, financial industry location entropy, banking industry location entropy, insurance industry location entropy, and shadow banking industry location entropy are all positive, and Most of the data are significant at the 10% level, indicating that there is a positive correlation between these variables and a spatial agglomeration phenomenon. In absolute terms, the Moran 's I index of the location entropy of the insurance industry and the shadow bank 's location entropy is higher than the Moran 's I index of the bank 's location entropy, indicating that the insurance industry and shadow banking in Guangdong have a higher degree of spatial concentration. On the whole, there is a positive spatial correlation in the development of the financial industry in Guangdong Province, which indicates that the regional differentiation of the development of the financial industry in Guangdong Province does not happen by accident, and the financial industry in Guangdong Province has agglomerated characteristics.

4.2. Spatial Econometric Regression

There is a spatial autocorrelation in the industry structure upgrade coefficient of the explained variables, the overall financial industry of the explained variables, and the segment entropy of the subdivided industries. Therefore, a spatial Dubin model including the explained variables, explanatory variables, and spatial weight matrix is considered for empirical analysis. Hausman's test was performed on each model to determine panel regression using fixed or random effects, and the results are shown in the table below:

Table 2. Regression Results

Explanatory variables	Adjacency matrix	Distance matrix	Nested matrix
fn	0.179**	0.176**	0.195**
	(2.17)	(2.13)	(2.37)
Wfn	0.0121	0.0497	-0.0686
	(0.10)	(0.30)	(-0.46)
Gov	0.0183***	0.0168***	0.0181***
	(4.44)	(4.00)	(4.03)
Invest	0.00365***	0.00489***	0.00418***
	(4.93)	(6.68)	(5.72)
FDI	0.0489***	0.0332***	0.0326***
	(5.83)	(4.09)	(3.86)
RD	-0.0105*	-0.0148**	-0.0216***
	(-1.76)	(-2.49)	(-3.51)
Open	0.0136*	0.0124	0.0193**
	(1.73)	(1.58)	(2.38)
Observations	294	294	294
R2	0.206	0.225	0.099
Hausman	Re	Re	Re

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The results show that the financial industry agglomeration has a significant positive effect on the industrial structure upgrade under the three spatial weight matrices, and the coefficients under the nested matrix are the largest. The government intervention, fixed asset investment, foreign direct investment, and foreign trade dependence as control variables showed a positive correlation with the upgrading of the industrial structure, and passed the 10% significance test, which is logical. In this paper, the regression coefficients of the research inputs are all negative values, which did not promote the upgrading of the industrial structure, contrary to the theoretical assumptions. The reasons may have the following two points: first, the accuracy of the measurement of research input indicators; and more importantly, the effect of technological progress requires a certain system as a guarantee.

5. CONCLUSION

Based on the existing research at home and abroad, this paper uses location entropy to construct an index system to measure the level of regional financial agglomeration, and calculates the location of the financial industry, banking, insurance, and shadow banking in 21 cities at or above the prefecture level in Guangdong Province. Entropy is used to measure the degree of agglomeration of each fifth, and the effect of financial agglomeration on the upgrading of industrial structure in Guangdong Province is tested using a spatial Dobin model. The results show that financial agglomeration promotes the upgrading of industrial structure through various transmission mechanisms. This article mainly proposes the following policy suggestions from the perspective of fostering financial agglomeration:

(1) Based on the existing financial scale, cities should continue to promote the development of the financial industry in order to maintain the positive role of the financial industry in

upgrading the industrial structure. While developing the financial industry, each city should pay attention to the positioning of its financial functions and build a coordinated financial development system. In particular, Guangzhou and Shenzhen should vigorously develop the financial industry to obtain the economic radiation effect brought by financial agglomeration.

(2) The strategy of building a multi-level financial center. From the perspective of China's practice, the phenomenon of economic gravity fading with increasing distance is very obvious. It is not enough to rely on the "two-pole" structure to bring about a rapid upgrade of the industrial structure in Guangdong. It is very important to establish a multi-level networked economic development strategy of "multi-points and faces". In the future, Guangdong Province should, based on the regional industrial structure, give play to the comparative advantages of various places, build a multi-level financial center during the construction period, achieve differentiated competition, and play a greater role in effectively radiating the financial industry.

REFERENCES

[1] Kindleberger, C.P. The Formation of Financial Centers:A Study in Comparative Economic History[M].Princeton University Press,1974.

[2] Jeremy Greenwood and Boyan Jovanovic, Financial Development, Growth,And The Distribution of Income[J].Journal of Political Economy,1990,98(5):1076-1107.

[3] Bossone B. Sandeep Mahajan, Farah Zahir. Financial Infrastructure,Group Interests and Capital Accumulation[C].IMF Working Paper,2003.

[4] Audrestch D,Feldman M P.R&D Spillovers and the Geography of Innovation and Production [J]. American Economic Review,1996,86(3):630-340.

[5] Wendy Carlyn, Colin Mayer.Finance,Investment and Growth [J]. Journal of Financial Economics, 2003, 69(1): 191-226.

[6] Pinghai Li, Xue Wang. Research on Industrial Structure Upgrade from the Perspective of Financial Agglomeration——Taking Guangdong Province as an Example (J), Journal of Guangdong University of Finance, 2009 (6): 51-59.

[7] Jun Liu, Jieyu Huang. Research on the Impact of Financial Agglomeration on the Real Economy Mechanism [J]. Management World,2007(4):152-153.

[8] Jieyu Huang, Zaibin Yang. Financial Agglomeration Theory [M]. Beijing: China Social Science Press, 2006.

[9] Fangzhi Fan, Lijun Zhang. Research on Financial Structure Transformation and Industrial Structure Upgrade in China [J]. Financial Research,2003(11):36-48.

[10] YiFu lin, Qi Zhang, Mingxing Liu. Financial Structure and Economic Growth:Taking Manufacturing as an Example [J] .World Economy, 2003 (1): 3-21.