

The Dynamical Relationship between the Spatial Agglomeration of Chinese Cultural Creative Industry and the Development of Economy

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Abstract: *The theoretical studies of cultural creative industry were far behind its actual development in China, so it is meaning to study more. This paper measured the degrees of spatial agglomeration of all Chinese provinces' cultural creative industries from 2008 to 2013 based on the theory of location quotient (LQ) to investigate the regional disparities at province level with the support of ArcMap software. Afterwards, we fit the relationship between the spatial agglomeration of all provinces' cultural creative industries and economic development in dynamic condition by the most simple regression model. The empirical results show that: the relationship between the spatial agglomeration of cultural creative industry and GDP is quadratic equation of one unknown instead of a double logarithmic model in statics. What's more, the influence of each province is different. The North China has a significant positive effect, the Northeast China and Central-south China present significant reverse effects. However, the influences of the South China, Southwest China and Northwest China are not significant. Also, the East China has both effects.*

1. Introduction

Since the 1990s, the role of cultural creative industry, a sunrise industry, to national economy and social development has become more and more important in developed countries. Creative economy has created some 22 billion dollars every day throughout the world in recent years, and increased at the rate of 5% [1]. However, the theoretical studies of cultural creative industry were far behind its actual development. In accordance with the published papers and books, the concept of cultural creative industry has not been determined. In 1947, German Horkheimer and Adorno put forward the concept of cultural industry [2]. In 1998, 'Creative Industry' was proposed by British Creative Industry Task Force in "Creative Industries Mapping Document" [3]. Then, there were two views related to the

definition of cultural creative industry [7-10]. In terms of theoretical research or actual analysis, we think the above definitions all reveal the nature of cultural creative industry, even if the names are not same exactly. The core components of creative industry are: creativity is the core content of products; using symbolic meaning to create value; intellectual property is protected [11]. Therefore, it is meaningful to study among industries or areas if we could define the scope and caliber clearly as required.

Along with the rapid development of regional economy, the influence of the spatial agglomeration of cultural creative industry to economy is becoming more and more clearly. So, the study of the spatial agglomeration of cultural creative industry is gradually developed. Domestic and international scholars both start to study it from various aspects. Spatial agglomeration concerns economics, geography and et al, which is beginning with the research of manufacturing industry [12-18]. Foreign scholars started early, and it was the initial attention to the special location of creative industry for Zukin (1982) to study the 'Loft' [19]. The process of spatial agglomeration of innovation and production activities with the global and local indicators which was carried out thanks to an original databank across 85 industrial sectors and 784 Italian Local Labor Systems from 1978 to 1995, and the influence of specialization or diversity externalities in the area to the innovative output in a particular local industry were studied [20]. Creative industries had a clear affinity for the CBD fringe and inner city, and different kinds of creative industries precincts lied in different cities [21]. The effect of business economic on industrial agglomeration was verified by using the data of cultural creative industries in Silicon Valley [22]. The creative class has a positive and significant effect on employment growth and new business formation at the regional level due to an analysis based on data for more than 450 regions in eight European countries [23]. Applying location quotient,

principal component factor and cluster analyses to all 308 Portuguese municipalities, for ten core creative groups, we found that only the knowledge-intensive activities densely concentrated and co-located in highly developed, large urban centrals [24]. As an emerging industry, it is difficult to assess the implicit value of cultural creative industry, which leads to most of the research of its spatial agglomeration rests on qualitative study in China [25-28]. There are three kinds of empirical studies: using Location Quotient, Gini coefficient, Moran's I, EG index and et al to estimate the degree of spatial agglomeration of cultural creative industry [29-31], analyzing the dynamic factors for the formation of spatial agglomeration [32,33], and discussing the influences [34].

Taken together, quantitative research is less than qualitative research on the spatial agglomeration of cultural creative industry. Also, most of the existing quantitative studies are split into the Time-series research that is focused on one metropolis like Beijing or Shanghai and the Cross-section analysis that is based on one point. In recent years, a double logarithmic model used for describing the relationship between the spatial agglomeration of Chinese cultural creative industry and the development of economy in static condition was already mooted by some researchers [35]. Would this model still hold if the object changes into dynamic panel data concerning various years and areas? Does the model keep same or change among different provinces? We will solve these questions in the following. This paper is divided into five sections. In Sect.2, we research on the data sources and research method. Next in Sect.3, we measure the spatial distribution of China's cultural creative industry. Then in Sect.4, we analyze the influence of the spatial agglomeration of cultural creative industry to economic development. Finally, Sect.4 presents the conclusion and insufficiency of our analysis.

2. Data Sources and Research Method

2.1. Research Scope and Data Sources

China held the Second National Economic Census in 2008 and the Third National Economic Census in 2013. During this period, per capital GDP increased from 810247 yuan to 1458443 yuan and the average annual growth rate reached up to about 16%. It means that Chinese economy develops quickly within this time, so we choose 2008 and 2013 as the starting and end point of our research. According to Communiqué on Major Data of The Second National Economic Census, Communiqué of The Third National Economic Census and China Statistic Yearbook 2009-2014 compiled by National Bureau of Statistics of China, this article defines the research scope of 30 provinces and municipalities of Chinese mainland (missing the data of Gansu Province).

Beijing released 'Cultural Creative Industry Classification Standard' in 2006 and divided cultural creative industry into nine sectors, namely: Culture and Art; Press and Publication; Radio, Television and Film; Software, Network and Computer Service; Advertising and Exhibition; Business of Art; Design Service; Tourism and Leisure Entertainment and Other Ancillary Service. On the basis of it and being compatible with China's National Economical Industry Classification, we choose three leading trades as our object of this study: Information transmission, computer services and software; culture, sports and entertainment; scientific research and technical services.

2.2. Research Method

Location Quotient was put forward by Hagget and was a universal method for research on spatial agglomeration [36]. Its formula is:

$$\text{quotient}_{ij} = (e_{ij}/e_i)/(E_{ij}/E_i) \quad (1)$$

Where quotient_{ij} is the location quotient of cultural creative trade employees in region i ; e_{ij} is the quantity of cultural creative trade employees in region i ; e_i is the quantity of cultural creative industrial employees in region i ; E_{ij} is the quantity of cultural creative trade employees in China; E_i is the quantity of cultural creative industrial employees in China. If $\text{quotient}_{ij} > 1$ in a region, it reflects that the region has a larger scale and higher degree of spatial agglomeration than the average of whole country.

3. The Spatial Distribution of China's Cultural Creative Industry

3.1. The Degree of Spatial Agglomeration

We calculate the location quotient of three leading trades with the formula (1) from 2008 to 2013. In order to compare clearly and conveniently, we use unweighted average method to measure the comprehensive degree of spatial agglomeration, noted as LQ. According to the calculate results, the location quotient of cultural creative industry in Beijing is the highest and holds a safe lead to other provinces. Although the location quotient of cultural creative industry in Beijing declines slightly in 2009, it still keeps the location quotient over 3.0. After that, the location quotient of cultural creative industry in Beijing continues rising and reaches 3.51 in 2013, which is as 14.6 times as the location quotient of cultural creative industry in Yunnan, the province scores the lowest. On the contrary, the location quotient of cultural creative industry in Yunnan is always the minimum and keeps falling during this period.

In China's four municipalities, the location quotient of cultural creative industry in Beijing, Tianjin and

Shanghai which lie in the east of China all have a higher degree than the national average. As for China's geographic area, there is unbalanced distribution of cultural creative industry in the North China as Beijing and Tianjin have high location quotient while Hebei, Shanxi and Neimenggu all have low. The Northeast China has balance of distribution and three provinces all get high scores. There is a slight imbalance of spatial distribution in the East China. The degree of agglomeration in Shanghai, Zhejiang and Fujian are high, while the location quotient of Jiangsu, a developed economy, is far below the national average values. In the Central-south China, all provinces, except for Henan, locate in the position of average level. The Southwest China is at a disadvantage in the whole, even if the location quotient of Guizhou Province reaches the national average. In the Northwest China, Xinjiang and Shan'xi both have high location quotient scores, especially for Xinjiang, whose location quotient of cultural creative industry exceeds a lot of economically developed provinces. For the perspective of economic circle, the agglomeration of cultural creative industry in Beijing-Tianjin-Hebei develops great because the role of Beijing. However, the location quotient of the Yagzte River Delta region is not in a leading position.

3.2. The Development Trend of Spatial Distribution

So as to show the development trend of the spatial distribution of China's cultural creative industry, we add different color into the maps from 2008 to 2013. The region whose color is deeper, the location quotient is higher, as the following figure:

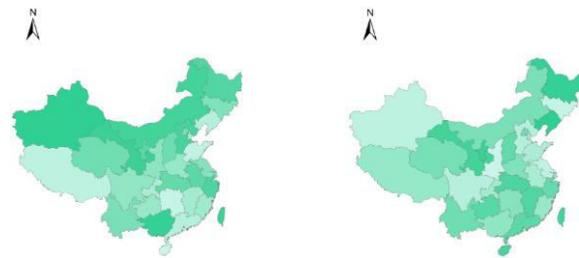
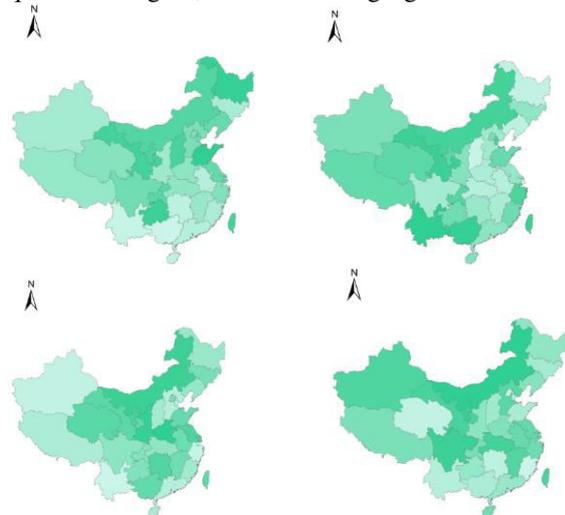


Figure.1 The Spatial Distribution of Chinese Cultural Creative Industry from 2008 to 2013

From a general view, the spatial distribution of China's cultural creative industry is gradually centralizing to the east and north regions during this period from 2008 to 2013. The location quotient of the North China declines in 2010 and 2011, but increases rapidly in the following two years and keeps locating in medium high. According to the order of timeline, the region which changes greatest is Xinjiang. In 2008, its location quotient lies in the middle. After continuous declination in 2009 and 2010, the location quotient of Xinjiang's cultural creative industry returns to the medium level. However, its location quotient gets a low scores in 2012 once again. In the last year, the location quotient of cultural creative industry in Xinjiang rises significantly and presents a very high concentration level. Conversely, the location quotient of cultural creative industry in the central region of China keeps smooth and steady during this time.

4. The Influence of Agglomeration to Economical Development

To solve the problem that the relationship between the spatial agglomeration and economic development in dynamic condition proposed in the Introduction, we try to build the most concise regression model to explore this from the initial state. By drawing graphs about the spatial agglomeration and GDP from 2008 to 2013, we find quadratic equation of one unknown is better than others. The model is as the following:

$$GDP=a1+a2LQ^2 \quad (2)$$

After being through Unit Root Test and Cointegration Test, we decide to use fixed-effect variable-coefficient model by Hausman Test. The regression results are on the table 1.

Table.1 Regression Results

Province	GDP=a1+a2LQ ²	
	a1	a2
Beijing	-33507.3	4212.886 (0.0980*)
Tianjin	-3661.12	8039.289 (0.0990*)
Hebei	-42382.9	143642.2 (0.0020***)
Shanxi	5491.673	8218.298 (0.8254)
Neimenggu	28169.45	-72077.25

		(0.0419**)
Liaoning	-8355.99	10577.94 (0.0020***)
Jilin	16160.81	-2365.500 (0.4386)
Heilongjiang	40854.61	-29327.27 (0.1277)
Shanghai	20547.61	-1046.919 (0.6867)
Jiangsu	32636.42	51158.36 (0.0000***)
Zhejiang	59408.84	-25958.69 (0.0001***)
Anhui	8347.806	6536.592 (0.1411)
Fujian	32548.16	-10766.42 (0.4825)
Jiangxi	5197.218	10270.37 (0.1329)
Shandong	-30273.3	177858.0 (0.0000***)
Henan	87775.16	-243671.1 (0.0034***)
Hubei	49710.13	-68035.53 (0.0007***)
Hunan	-6017.8	9910.849 (0.0008***)
Guangdong	99891.45	-56773.82 (0.0000***)
Guangxi	14447.42	-5305.780 (0.3978)
Hainan	-187.84	2848.879 (0.7136)
Chongqing	-13969.1	51870.51 (0.1841)
Sichuan	3142.28	19640.14 (0.0007***)
Guizhou	17618.19	-11699.93 (0.3946)
Yunnan	17262.33	-115815.0 (0.1240)
Xizang	591.51	-15.18290 (0.9988)
Shan'xi	-1426.13	9162.620 (0.1421)
Qinghai	3819.488	-5189.593 (0.8139)
Ningxia	2958.48	-1600.029 (0.7957)
Xinjiang	6405.956	-108.8718 (0.9866)
R ²	0.955517	
Adjusted R ²	0.933646	
F-statistics	43.68893	

	(0.0000***)
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Note: numbers in brackets are the standard errors of being estimated coefficients. *, **, *** means the significance level of 1%, 5%, 10% separately.

From the results, whatever the linear or quadratic equation, the adjusted R-square both reach over 9.3 and F-statistics are under 1% significance, which means two models fit well. If we study the coefficient of each independent variable, we can find that the quadratic equation is more significant. Hence, we tend to choose the quadratic equation to explain the relationship between the spatial agglomeration of Chinese cultural creative industry and the development of economy.

As same as the above discussion, we analyze the influence from the aspect of geographic area. The North China has a positive and significant relationship between the spatial agglomeration and GDP except Neimenggu, so Beijing and Tianjin are good at both economy and the spatial agglomeration of cultural creative industry. Among the three provinces in the Northeast China, the relationship of Jilin and Heilongjiang present a state of negative. Although the spatial agglomeration of cultural creative industry develop well in the Northeast China, the speed of economic development is behind many provinces. The regression results of the East China show huge differences. The coefficients of Shanghai, Zhejiang and Fujian whose spatial agglomeration are high are negative while other provinces present positive effects. It can explain two practical problems for us: the first one is that why dose Shanghai, Zhejiang and Fujian keep rapid growth of economy with continuous decline of the spatial agglomeration; the second one is that although the spatial agglomeration of Jiangsu Province is lower than national average, its economy and spatial agglomeration of cultural creative industry keeps synchronous growth recently. This two points are consistent with our previous research. All provinces in the Central-south China have significant relationship. Guangdong Province in the South China appears negative relationship and it is quite significant. This is why the spatial agglomeration decreases but the economy is developing with great rapidly in Guangdong. In the Southwest China, the spatial agglomeration of Yunnan and Guizhou's cultural creative industry are diminishing while GDP are increasing, which conforms to the regression model. Except for Shan'xi Province, the Northwest China presents negative and non-significant relationship. It may be because the role of its fledgling cultural creative industry to economic development has not reflected.

5. Conclusion

Firstly, this paper defines the research scope of 30 provinces and municipalities of Chinese mainland

(missing the data of Gansu Province). Then, we adopt Location Quotient to measure the degree of spatial agglomeration of cultural creative industry from 2008 to 2013 and analyze the tendency of location distribution. Lastly, using the most concise model to fit the role of spatial agglomeration to economic development. The results show that the relationship between the spatial agglomeration of Chinese cultural creative industry and GDP in dynamism condition is quadratic equation of one unknown instead of double logarithmic model in static. What's more, different provinces have different influence coefficients. The regions with high agglomeration degrees have significant relationship, such as the North China has positive influence and the North China and the Central-south China have negative effects. On the contrary, the areas with low agglomeration degrees have non-significant relationship, like the South China, the Southwest China and the Northwest China. The East China has both positive and negative influence. Provinces with high agglomeration degrees have significant negative relationship and provinces with low agglomeration degrees have positive relationship. It is meaningful for all regions with high spatial agglomeration of cultural creative industry to balance the relationship with economic development.

However, there are three insufficient points in this article. First of all, in this national research, we lack the analysis of Gansu Province because of the missing of data. In the second place, we use Location Quotient which is the most commonly method among related academic research to measure the degree of spatial agglomeration, but we cannot make sure that Location Quotient which comes from the studies for manufacturing industries is completely suitable for cultural creative industry, an industry with special characteristics. In the end, not all coefficients in our model are significant, so we have to improve the model further.

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7. References

- [1]Chen Hanxin. Chinese Cultural Creative Industry: Developmental Actuality and Prospect. *Journal of Economics Geography*, 2008, 28(5):p.728-733.
- [2]Horkheimer, Adorno. *Dialectics of Enlightenment*.2004, Beijing: Xinhua Publishing House.
- [3]Jin Yuanpu. The concept and characteristics of creative industry in the modern world. *Film Art*, 2006(3):p.5-10.

- [4]Kimindo Kusaka. *The Theory of Cultural Industry*. 1989, Oriental Press.
- [5]David Hesmondhalgh. *Creative Industries*. 2007, Beijing: Tsinghua University press.
- [6]Lin Tuo, etc. *The Frontier Report of the Development of International Culture Industry*. 2004, Beijing: social sciences academic press.
- [7]Johns Howkins. *The Creative Economy: How People Make from Ideas*. 2001, Allen Lane: The Penguin Press.
- [8]Richard Caves. *Creative Industry Economics*. 2004, Beijing: Xinhua Publishing House.
- [9]Li Wuwei. *Creative Industrial Introduction*. 2006, Shanghai: Xuelin Publishing House.
- [10]Jin Yuanpu. Conceptions of Cultural Creativity Industry. *Journal of Tongji University*, 2009, 20(1):p.47-48.
- [11]Li Wuwei, Wang Huimin. Creative Industry Promoting the Changing of the Ways of Economic Growth. *China Industrial Economics*, 2006, (11):p.5-13.
- [12]Glenn Ellison, Edward L.Glaeser. Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach. *Journal of Political Economy*, 1997, 105(5):p.889-927.
- [13]Adelheid Holl. Manufacturing Location and Impacts of Road Transport Infrastructure: Empirical Evidence from Spain. *Regional Science and Urban Economics*, 2004, 34(8):p.341-363.
- [14]Eric Marcon, Florence Puech. Evaluating the Geographic Concentration of Industries Using Distance-based Methods. *Journal of Economics Geography*, 2003, 3(4): p.409-428.
- [15]Ron A. Boschma, Rik Wenting. The Spatial Evolution of The British Automobile Industry: Does Location Matter?. *Industrial and Corporate Change*, 2007, 16(2):p.213-238.
- [16]Peng Zhongwen, Huang Yan. An Empirical Study on Spatial Agglomeration and Affecting Factors of Chinese Equipment Manufacturing Industry. *Soft Science*, 2011, 25(5):p.57-60.
- [17]Wu Aizhi, Sun Tieshan, Li Guoping. Spatial Agglomeration and Regional Shift of Textile and Garment Industry in China. *Journal of Geographical Sciences*, 2013, 68(6):p.775-790.
- [18]Wen Dongwei, Xi Guoming. Spatial Agglomeration and Exports of China's Manufacturing Industry: Research of Enterprise Level. *Management World*, 2014(10):p.57-74.
- [19]Tan Na. Ecological Metaphor: Value Creation and International Comparison of Creative Industry.2004, Beijing: Economic and Management Publishing House.
- [20]Raffaele Paci,Stefano Usai. Externalities, knowledge spillovers and the spatial distribution of innovation. *GeoJournal*, 1999, 49(5):p.381-390.
- [21]Hutton T. Reconstructed production landscapes in the postmodern city: applied design and creative services in

the metropolitan core. *Urban Geography*, 2000, 21(4):p.285-317.

[22]Stuart S. Rosenthal. Geography, Industrial Organization, and Agglomeration. *Center for Policy Research*, 2003, 56(4):p.1-22.

[23]Ron A.Boschma, Michael Fritsch. Creative Class and Regional Growth-Empirical Evidence from Eight European Countries. *Jena Economic Research Papers*, 2007, 66:p.1-33.

[24]Sara Santos Cruz,Aurora A.C.Teixeira.The neglected heterogeneity of spatial agglomeration and co-location patterns of creative employment: evidence from Portugal.*FEP Working Papers*,2013,508(10):p.1-29.

[25]Hua Jian. Industry Cluster and Knowledge Resource—The Developing Rule and Drive of the Cultural and Creative Industrial Parks. *Journal of Shanghai University of Finance and Economics*, 2007, 9(4):p.3-9.

[26]Chen Jianjun, Ge Baoqin. The Influence of Urbanization on Cultural Creative Industrial Development. *Zhejiang Academic Journal*, 2008(6):p.163-167.

[27]Chu Jinfeng. A Study on Effect Factor of Creative Industry Agglomeration in Shanghai. *Journal of Economics Geography*, 2009, 29(1):p.102-107.

[28]Li Wuwei. Construction of Culture Creative Industry Convergent Areas. *Gansu Social Sciences*, 2014(3):p.1-7.

29]Zhou Shangyi, Jiang Miaomiao, Wu Liping. Characteristics of Spatial Distribution of Cultural Industry in Beijing Urban Area. *Journal of Beijing Normal University*, 2006(6):p.127-133.

[30]Huang Jiang, Hu Xiaoge. Spatial Pattern of Creative Industry---A Case Study of Hangzhou. *Journal of Economics Geography*, 2011, 31(11):p.1851-1856.

[31]Yao Lei, Zhang Min, Wang Fei. Characteristics of Evolution and Differences of the Spatial Distribution among Different Types of Creative Industries in Nanjing. *Human Geography*, 2013:p.42-48.

[32]Yang Yongzhong, Huang Shuyi, Lin Minghua. Study on the Formation Path and Evolution Mechanism of the Creative Industrial Zones. *China Industrial Economics*, 2011(8):p.128-138.

[33]Wen Hu, Hu Bing. A Spatial Econometric Study on the Influence Factors of Provincial Cultural and Creative Industries Development in China. *Journal of Economics Geography*, 2014, 34(2):p.101-107.

[34]Han Shunfa, Guo Xinru. An analysis of the Influence of Chinese Culture Creative Industry to Total Factor Productivity. *Statistics and Decision*, 2012:p.95-97.

[35]Bao Feng. Study on Cluster Development of China's Cultural Creative Industries. 2013, *Jilin: Jilin University*.

[36]Zhao Qian. Contrast Research on the Agglomeration Effect of Cultural and Creative Industries between Beijing and Shanghai. 2012, *Beijing: Beijing Institute of Fashion Technology*.