Temporal and Spatial Analysis on Labor Productivity of Radio and TV Industry in China

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Abstract

In order to find out the industrial characteristics and development trend of radio and TV industry in China, the developing course of this industry has been analysis from labor productivity, based on contrastive analysis and diagrammatic analysis. By comparison to three major industries, the developing rapidly and hopeful road has been exposed, and before it has not received adequate recognition to itself. In order to study the spatial distribution rule, using the spatial analysis function of GIS and spatial statistical models, quantitative analysis and qualitative evaluation on Radio and TV industry in China have been done. Then from the spatial scale, the spatial modes of this industry both on province and county scale have been studied deeply. The results show that there are certain spatial agglomerations in general for labor productivity in China. In the local region, obvious spatial associations exit too.

1. Introduction

Radio and TV industry had no any marketing behavior but a mouthpiece of the political party and the government before Jun. 28, 1979. Just from this day the first commercial TV ad in China had been broadcasted in Shanghai TV Station. Radio and TV department has been provided with economical functions subsequently (Zhou Hongduo, 1990). Though the inherent political functions have been weakened in some aspects, they are existent and could not disappear completely. All of these destine the special characteristics of this industry. Just for it, both economical value created by it and its influences to social and economical activities have been ignored for a long time. Even today, attentions paid to it are not enough. Researches on this industry mainly concentrate on sociology, culture, aesthetics and psychology etc., economical studies especially quantificational researches are scarce. And this point is the subject of this paper, under the condition of enough statistical data, which economical characteristics will be brought out.

Two aspects, developing tendency and spatial conglomerations, have been carried through to describe the industrial characteristics. Temporal statistical analysis and spatial statistical analysis have to be done. There are many models and methods applied in depicting the developing course and tendency, but traditional statistical analysis could not settle spatial problems.

Then, the study on spatial statistics, spatial data analysis began. Spatial statistics is a new subject, which has developing with the application of spatial high-technology in prospecting for oil, aerial survey and remote sensing. There are many problems have to be settled on spatial relations in the study of spatial information and other phenomena correlated with them. The treatment of spatial data analysis from the lattice data perspective focuses on two main issues: testing for the presence of spatial association, and the estimation of regression models that incorporate spatial effects. Examples can be found in Haining (1984) at the intermediate level, and in Griffith (1988), Cressie (1991), and O'Loughlin and Anselin (1991) at the more advanced level. An extensive discussion of operational implementation issues, including extensive listings of software code, is given in Anselin and Hudak (1992).

2. Temporal tendency analysis

Radio and TV industry had been a pure political controlled system in China till 1978. With the bringing into effect of a series of the political and economical policies, this industry has stepping into a high-speed developing phase. In order to depict industrial

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efficiency, labor productivity is used. Labor productivity(*LP*) is an important criterion which can be used to weight industrial benefiting status. It reflects the income created by one percent of labor force in an industry (Dong Chun, 2006).

Radio and TV industry in China has some special characteristics. Which gross income mainly comes from two ways, government and markets, namely financial money and lucrative income. Figure 1 figures the corresponding *LP*.

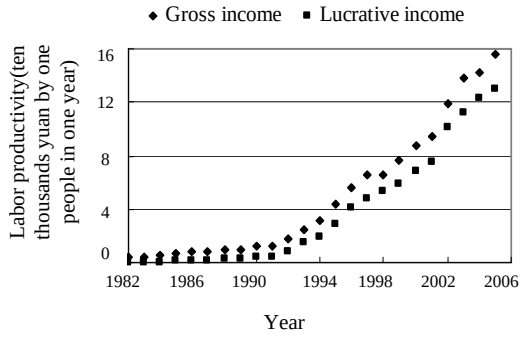


Figure 1. Labor productivity of radio and TV industry in China (1982-2005)

From Fig.1 we can see two uplifting curves in the charts, and each curve has a turning point in 1991. Much more income has been gained started this year for some political files benefiting to this industry have been put in force. Beginning with 1991, the growth is 10 times(considering financial funds) and 13.5 times(no considering financial funds) than the last stage.

In order to compare radio and TV industry with national other economical departments, the index of comparative labor productivity(*CLP*) has been used. It reflects percents of income to national *GDP* created by one percent of the labor force in an industry (Dong Chun, 2006). Figure 2 shows the advantage of radio and TV industry than three major industries in China.

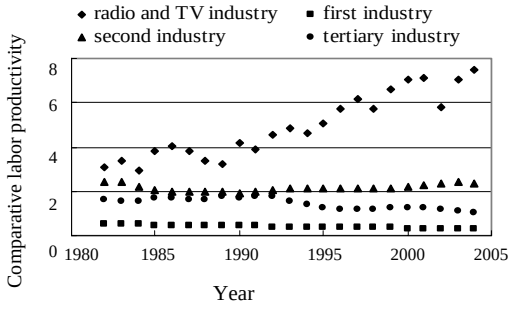


Figure 2. Comparative labor productivity of radio and TV industry and three major industries (1982-2004)

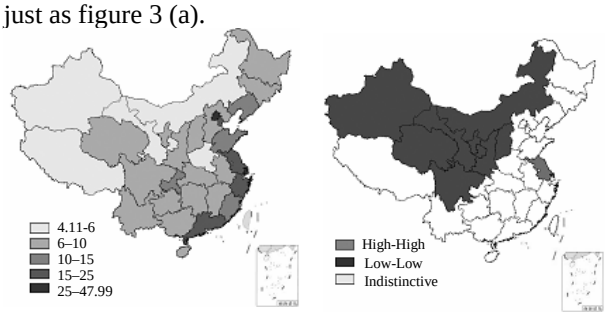
There are two important and special points among radio and TV industry and three major industries. Firstly, there is hardly obvious growth for three major industries during the last 22 years, and tertiary industry even shows the current to go down, but obvious stepping upwards is showed by radio and TV industry. Secondly, *CLP* of radio and TV industry is always higher than three major industries at all times even on its lowest location, and the gap is broader and broader. The value of radio and TV industry is 23.5 times to first industry, 3.2 times to second industry and 7.2 times to third industry. A conclusion can be drawn that the young radio and TV industry is an efficient industry, and it is predictable that with the development and application of new technology and improvement of people's living standards the high-speed tendency will continue in the following years.

3. Spatial distribution analysis

In common sense, the development of an industry in a region should be in certain extent relates to whose regions neighboring to it. In the following, demonstration analysis on regional difference of *LP* has been done from two scales of province and county.

3.1. Interprovincial labor productivity analysis

The outcome of temporal analysis shows that from the national scale, radio and TV industry has higher developing speed than three major industries in China. The same advantage lies in 31 provinces in China. *LP* of this industry are higher than three major industries in all provinces. Different gaps exist among provinces, and there are unimaginable differences appear in Shanghai (5 times) and Beijing (9 times). In order to find out the spatial characteristic of interprovincial difference, cluster analysis has been used to classify for the value of labor productivity, and the outcome of classification of 31 Chinese provinces can be mapped just as figure 3 (a).



(a) (b)

Figure 3. Provincial spatial distribution of LP in China (2004)

It is no difficult to find that there is a clear characteristic of the five classes in space. The highest provinces of *LP* are Shanghai and Beijing. Taking advantage of national economical or political center, they hold incomparable developing conditions for radio and TV industry. Guangdong, Zhejiang and Tianjin sit in the second class, and the third class include Jiangsu, Fujian and Shandong province. These six provinces are economical highly developed regions located in east China. The remainder two classes include 23 provinces, they lie mostly in middle and west China, the developing regions and undeveloped regions. Distinct difference and rule has been revealed, from east to west, from coastland to backland. Moreover many provinces in the same class are neighbors.

To analysis the spatial characteristics deeply, spatial autocorrelation models have been applied to explore the spatial concentration of this industrial *LP* among 31 provinces. *Moran's I* statistics have been computed firstly. *Moran's I* is 0.2845 and *p-value* is 0.005, the result show that to *LP* of radio and TV industry, there is positive spatial correlation among provinces. Namely high value of *Moran's I* statistics of *LP* in a province is associated with high values of the variable in neighboring provinces, by contraries low value of *Moran's I* statistics *LP* in a province is associated with low values of the variable in neighboring provinces.

Moran's I statistics is a measure unit for studying general autocorrelation. It is can generalize the spatial dependence degree in a general spatial mode, but it is difficult to find the spatial associating mode lies in different spatial regions. Here Local Indicators of Spatial Association (*LISA*) is competent to find the spatial associating mode lies in different spatial regions. The outcome is "cold-point" region has been mapped distinctly in figure 3(b). It includes five provinces in northwest China, Inner Mongolia municipality, Shanxi and Sichuan province. Because of the indistinctive statistical value, spatial distribution for other provinces could not to be reveled by these models.

3.2. Inter-county labor productivity analysis

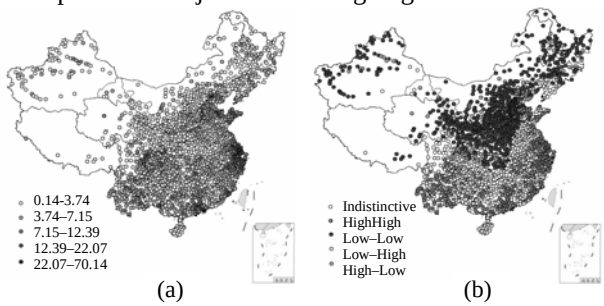
Ad income is a very important source in a province, but in county angle, maintenance fee for CATV replaces ad income. And in many depressed areas, CATV is a luxurious good relative to their purchasing power. Then inter-county analysis will reflect other questions different from inter-provincial analysis.

On the scale of county, there are greater differences of *LP* in China (Table 1). For example, the No.1 Minghang county (in Shanghai City) gets 501 times to Yanchuan county (in Shanxi Province) in 2004. Then, research on county scale is provided with more important practical significance.

Table 1. The first and last ten counties of Labor productivity (Lp) in 2004

The first ten counties			The last ten counties		
county	province	*Lp*	county	province	*Lp*
Minghang	Shanghai	70.14	Baoting	Hainan	0.67
Songjiang	Shanghai	42.43	Feidong	Abhui	0.66
Qingpu	Shanghai	36.05	Danfeng	Shanxi	0.65
Yilong	Sichuan	28.52	Hanyin	Shanxi	0.59
Yiwu	Zhejiang	28.19	Chunhua	Shanxi	0.58
Yongkang	Zhejiang	27.29	Sanyuan	Shanxi	0.55
Pinghu	Zhejiang	26.91	Nanzhao	Henan	0.55
Huimin	Shandong	26.69	Mancheng	Hebei	0.51
Baoan	Guangdong	26.58	Chaoyang	Liaoning	0.47
Fengxian	Shanghai	26.48	Yanchuan	Shanxi	0.14

Another characteristic is the counties with highest productive efficiency are absolute majority who located in east China, especially in the southeast coastal areas and the Yangtse River drainage areas expect Yilong county in western Sichuan province. On the other hand, the counties with lowest productive efficiency are mainly located in middle and west China. The spatial rule is just as the foregoing conclusion.



(a) (b)

Figure 4. Spatial distribution of *LP* of counties in China (2004)

The spatial distribution map, figure 4(a), is the better embodiment of this rule. The highest productive clusters are positioned in three big economical regions centering by Shanghai, Beijing and Guangzhou respectively. Besides them, the other two centers lie in Sichuan basin and central section of Yunnan provinces. Though economical conditions are not in vantage ground, but for some cultural factors and support coming from central and regional government, radio and TV industry in these counties have better development. The further spatial statistical analysis has been done, and the outcome of spatial autocorrelation is distinctive, *Moran's I* is 0.2906, *p-value* is 0.001. It indicates that just like provinces, there is positive spatial autocorrelation among 1969 counties, and this indication is even more evident. *LISA* clusters, figure 4(b), can reflect this point directly. Large numbers of counties in Yangtse Rive Delta, Zhujiang River Delta,

Fujian province, Yunnan province and Sichuan basin are hotspots, and north(except Beijing and Tianjin), middle, northeast and northwest China etc. are falling into cold-spots.

3.3. Contrastive analysis on both province and county scales

Whether from province or county scale, spatial centralization exists certainly for *LP* of radio and TV industry in China. And from general scale, there are positive autocorrelation among all the provinces and counties. Secondly, there is a common ground between these two scales, namely from the point of view of *LP*, the provinces and counties in middle China are mostly concentrated cold-spot regions. Interprovincial analysis could not gain hotspots due to indistinctive results. Prefectural labor productivity analysis shows that counties in Yangtse Rive Delta and Zhujiang River Delta are the most stirring hotspots.

The other three differences between the two kinds analysis are the following. Firstly, the differences among counties are greater, and the gaps among counties on different classes are much bigger than provinces. Secondly, on provincial scale, aiming to *LP* of radio and TV industry, Sichuan and Yunnan province are all not belonging to developed provinces, but quite a few counties in these two provinces are hotspots otherwise. Thirdly, considering gross income or lucrative income, northeast China is an active area, but relative to the income, too positions for employees are left behind, so *LP* is lower in this region. They are still belongs to cold-spots.

4. Discussion and Conclusion

Because of historical reasons, and the special dual political and economical attributes, radio and TV industry in China has the particular characters. The industry has a delighted development considering *LP* in the last twenties, and the developing speed even exceeds three major industries largely, and the gap expands sequentially. This conclusion has been testified by the above temporal statistical analysis.

On the other hand, for the differences consisting in geographical conditions and economical developing level, spatial differences of *LP* exist certainly. By spatial autocorrelation analysis integrating GIS, the spatial dependence and spatial general and local correlations have been revealed. And analysis deeply has found that there are different spatial congregating characteristics on province and county scale.

A new attempt to research this special industry has been made from two temporal and spatial scales in this paper, it is immature whether on research route or mode. Secondly, the statistical data of radio and TV industry in China are collected in the system of The State Administration of Radio and Television. They are maybe insufficient to represent the whole industry. Thirdly, the methods and models applied in this paper are limited and even too few. We will strengthen them by studying deeply in the future.

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