

The Formation Mechanism and Guiding Strategy of Metropolitan “Lamp Shadow” Phenomenon

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Abstract

The metropolitan area is an important carrier to enhance regional innovation capacity and soft power. There are always some imbalances in the dynamic process of regional development, for example, the metropolitan “lamp shadow” phenomenon. In this paper, we take the first nature and the second nature as research perspectives and construct a theoretical framework to analyze the “lamp shadow” phenomenon by using the gravity model and the new economic geography theory. Then we analyze the cause and the intrinsic mechanism of “lamp shadow” phenomenon in terms of increasing returns, population migration and transportation cost. Ultimately, a guiding strategy is proposed, based on a case study on the megalopolis in Shanghai and Nanjing from Yangtze River Delta, on how to ease the “lamp shadow” phenomenon by means of integrated transportation and upgrading metropolitan radiation force.

Keywords

Metropolitan, Gravity Model, Lamp Shadow, First Nature, Second Nature, Yangtze River Delta

1. Introduction

Generally, there are always some imbalances in the dynamic process of regional development, so how to solve these kinds of regional imbalances is an undeniable requirement for sustainable economy at macro level, and also is a very hot topic for academic study and policymakers in recent years. The so-called metropolitan or megalopolis circle is composed of one or two large cities or mega-cities as the core [1]. It spreads out

and leads a number of small and medium-sized cities within a certain range around, making them the regional urban agglomerations or urban zones that have certain influence around the world [2]. With the international economic transformation and unceasing development of globalization, China is playing an increasingly important role in the world economic system. Cities, whose function and structure are constantly changing as well, have received recognition and attention in the development of world economic system [3]. Small cities, which were once small towns, are now turning into medium-sized cities or large cities, some even mega-cities. Since China is vast in territory, so every place differs from each other in a thousand ways and clearly cannot develop in the same pace in terms of the natural factor, economic level and self-diatheisis. The construction and transformation of the second nature in every area are in need of keeping with the trend of the time based on deep digging the first nature. Tested and proved by history, China's metropolitan model is playing a leading role in the process of economic reform and development. However, compared with developed countries, China's metropolitan model has some problems and discrepancies, and the "lamp shadow" phenomenon is one of them. To study and solve the "lamp shadow" problem is an important and urgent issue for administration officials and academic scholars both.

The paper points out a word "lamp shadow". How to understand this phenomenon? Originally, the term of so called "lamp shadow" refers to the shadows under lightening lamp due to the block by themselves. Extended to the economic level and regional development, an analogy can be drawn between its initial referent and a phenomenon of regional development within metropolitan economic circle. It is used for indicating the siphon phenomenon during the dynamic process of regional unbalanced development. While a central city is able to exert considerable agglomeration effects on surrounding cities in terms of resources, capital, manpower and the talents, resulting in slow development of surrounding areas, which in turn causes trends of slowing down or even regression at the whole society scale. Compared with abundant capital and human resources of central cities, those disadvantaged cities may well be caught in a vicious circle of capital scarcity, weak attraction, lagging development and lead to imbalance in regional advance forms [4]. Following the study concerning urban-rural integration and regional cities being carried out progressively, in metropolitan areas centered at radiating metropolises, "lamp shadow" areas wield profound influences on the construction of integrated development both spatially and economically considering its enormous prospective development and the significant role it is playing as the object of study.

New economic geography shows that, two regions with supposed same external conditions would finally evolve into two places with completely different production structures according to "core-periphery" model under the interacting effect of increasing returns, population mobility and transportation costs [5] [6]. Some surrounding cities in the metropolitan area will develop into "lamp shadow" areas influenced by these elements. In this regard, it becomes particularly important to exploit "the first nature" and create "the second nature" to solve this issue, which are the formation mechanism of the phenomenon of "lamp shadow". In this paper, we try to explore the theoretical

framework and the formation mechanism of the “lamp shadow” phenomenon. Taking the Yangtze River Delta as an example, which is the only China’s world-class metropolis, we would explore the solving strategies for the “lamp shadow” phenomenon, compare it with the developed countries, analyze the existing problems in the development process in China, and develop different regional economy by adjusting measures according to local conditions.

2. The Theoretical Framework of Analyzing the Phenomenon of “Lamp Shadow”

2.1. Universal Gravity Model

By studying the relationship of economic development between core city and radiation surrounding cities in the metropolitan area, we found that this kind of relationship conforms to the universal gravity model:

$$F = G \cdot \frac{M \cdot m}{r^2}$$

Referencing the above model, we can also divide all factors of radiation for metropolitan areas into two kinds of factors: one kind is promoting factors and another kind is hindering factors, so we will get a radiation model of city circle development like the following form:

$$F = k \cdot \frac{G_1 \cdot G_2}{r_1^2 r_2^2}$$

Among this model, F represents the economic radiation intensity that core city acts on surrounding cities, k represents the radiation coefficient (constant), but there are differences between different regions. This article takes GDP as an indicator to measure the level of the city’s economic development, which belongs to promoting factors. G_1 represents the GDP of the core city; G_2 represents the GDP of the surrounding city. And the r_1 and r_2 shows the impediments that influence the radiation of core city, which belongs to hindering factors, including the distance, the institutional hinder which influences inter-city exchanges, etc.

The model shows that economic development level of the core city and radiation distance are the main factors influencing the radiation level of the regional economy. The higher economic development levels of the core city, the greater intensity of the radiation; while the smaller distance the greater radiation effect. Therefore, in the Yangtze River Delta metropolitan area, the economy of those cities near Shanghai such as Su-xi-chang and Hang-jia-hu areas developed dramatically, and the industrial technology level increase greatly. Correspondingly, the economic development of places far away from Shanghai is relatively slow, such as Lianyungang, Suqian in Jiangsu Province, and Jinhua, Quzhou in Zhejiang Province, Fuyang, Anqing in Anhui Province, which located close to the edge of the Yangtze River Delta Metropolitan areas. It showed obvious “lamp shadow” phenomenon in that places. We will analyze important factors that hinder or enhance the effects of radiation from the first nature and second nature and other theoretical perspectives as follows.

2.2. Perspective of First Nature

The so-called first nature perspective refers to naturally existing condition in nature. The advantages show the congenital land efficiency and the agglomeration effect of advantages of geography. China has an extensive land, rich resources and diversified climate. China has higher altitude in the west and lower altitude in the east; and the terrain is in a ladder shape. The western part of china mainly are highlands, mountains, basins and other terrain, while the eastern part of china mainly are plane and hills. From the development of three types of industries, the eastern cities have congenital land advantages. From the factors of living environment, the eastern part has delightful weather and plentiful rainfalls which are more suitable for human resident and industrial development. Therefore, the congenital land efficiency of the eastern part is higher than is in the western part. The advantage of the eastern is longer coastline, which means lower transport costs for shipping transportation. So it is very easy and natural to promote international trade and industrial agglomeration. From a development perspective, the development speed of eastern part is faster than western part during the past decades. So we can conclude that different natural resources contained in the advantages of first nature can be an important incentive to spatial variation of industrial and regional development.

In city clusters, large-scale enterprises tend to concentrate upon the places with excellent natural conditions. The combination of labor and natural resources always influence and restrict each other, then the distribution pattern of mankind's early life are formed. In the next development process, different natural resources are exploited excessively. Considering the efficiency of natural resources exploitation and the differences of natural resource abundance in different areas, industrial spatial differentiation between different regions gradually come into being. Following the principle of "survival of the fittest", regions with first nature advantages developed quickly by means of industrial agglomeration. On the contrary, it appears to have obvious "lamp shadow" phenomenon in other disadvantaged places. Thus, as the first elements of production of mankind, the uneven distribution of natural resources in space decides that different regions have differentiated phenomenon of specialization. Natural resources play an important role in the formation of specific industrial agglomeration affecting no matter original population distribution or the later early stage of industry development. The influence will last long time until later stage of economic development.

2.3. Perspective of Second Nature

Humanized natural objects formed of human production practices is considered to be second nature, which are all natural objects that human being understand and transform. In the process of economic development, if the first nature is seen as innate endowment, then the second nature is transformed artificially on the basis of natural conditions for development needs [7]. We can view it as the extension of the first nature. In the process of creating the second nature, the primary task is to improve the transportation and other infrastructure constantly.

During the 13th Five-Year Plan period, China will introduce implement opinions of improving traffic system and the capacity of supply service, aimed at seven aspects, strengthening the cohesion among comprehensive hubs, promoting the construction of inter city transportation, promoting multimodal transport vigorously, building intelligent transportation fully, improving the express logistics service, enhancing support service consumption, and promoting the development of green security. Through a series of major transportation infrastructure, the advantage of major economic gathering area will be strengthened, which not only make the external links more convenient and the costs of logistics and transport lower, but also help promote the development of interactive coordination between the different economic gathering areas.

When the economy and production develop to a certain degree, the profit and distribution can schedule the production materials in a certain area actively instead of depending on natural resources. Take Silicon Valley in the United States as an example; although California has excellent geographical location, beautiful environment and pleasant climate, it does not highlight its natural advantages. In fact, with convenient transportation, stable market and several top universities which good at science, Silicon Valley focuses on innovation of environment and culture and is still the world of talent now. What is In accordance with the new economic geography core idea is that when the first natural advantage is similar, the second natural advantage determines the active degree of regional economic, endogenous factors of production transfers to meet the “core-periphery” model, namely the advantage of agglomeration. As it can be seen, the first natural advantage plays an important role in early economic development of the region’s economy, but in the late period of economic development, the second natural advantages take the dominant position.

The development of metropolitan area has been not satisfied with the original first and second natural advantages. Therefore, the re-discovery of first nature and re-creation of second nature are important measures to reshape Chinese economic geography. For example, it is very important to excavate the natural advantage of non mainstream industries in the field of “lamp shadow” area, or encourage more ultimate application of scientific and technological progress to promote the upgrading of industrial structure, and to improve the position of inferior region in the economic geography of urban agglomeration from the view of space reconstruction and construction of traffic facilities, institutional arrangements and other aspects.

3. Analysis on the Formation Mechanism of “Lamp Shadow” of Metropolitan Area

From the point of view of time, big cities are human agglomeration area since ancient times, because of the rich natural resources and social resources. From the perspective of space, the modern social economy is almost starting from the city as the object. As the center of economic activity, the central city in the economic intensity, industrial structure, or the level of efficiency are leading the surrounding cities. The phenomenon of “lamp shadow” vividly depicts the fact that urban development is not balanced. In

order to reduce the gap between rich and poor, to achieve the development of regional integration, it is necessary to analyze the phenomenon of “lamp shadow”. Based on the new economic geography, this paper analyzes the formation mechanism of the phenomenon from the following three aspects: increasing returns, population mobility and transportation costs.

3.1. Increasing Returns

The new economic geography represented by economists such as Krugman’s thoughts, increasing return refers to the economy of interrelated industries and economic activities, because of the close position in space that brings cost savings, or because of economies of scale that bring industrial cost savings [5]. The industrial or economic activities of the urban agglomeration can save the cost because of the gathering, make the industrial or economic activity concentrated. The metropolitan area is a typical phenomenon of the spatial agglomeration. Among them, some of the surrounding cities due to the division of labor specialization, geometric scale factors, the production of non segmentation and financial factors become shadow area under lamp; these factors can lead to increasing returns [8]. Correspondingly, the central city has a large number of enterprises, in large-scale production, the product by the effective division of labor or production line is more efficient than the individual to complete each process. These enterprises often have much large equipment, the production and maintenance costs of the unit are lower than the cost of small equipment. When the scale of the industry reaches to a certain extent, some of the elements of production, such as technology and equipment, computer operation, and the streamlined production reach a saturated state, the production cost is reduced, and the product output can be maximized. On the financial aspects, the central city has enough production scale and the original accumulation to attract foreign investment and cooperation, and it is conducive to raising funds, purchase raw materials or semi-finished products, sales and other aspects. These factors can lead to increasing returns to scale. Increasing returns can be seen everywhere in economic activities, especially in the primary stage of urban or industrial economic development. Krugman believes that increasing returns is essentially a regional and local phenomenon, mainly in terms of trade and specialization. The market, technology and other external factors which support the increasing returns are mainly derived from the regional and local economic agglomeration [9]. With the close spatial aggregation of increasing returns to scale, spatial agglomeration is the main factor of city expansion and the formation of the regional center and the self-strengthening characteristics is essential to elucidate the mechanism of industrial agglomeration in economic activities.

3.2. Population Migration

China has a large population size, and a large population base. The problem of population has been paid more attention by experts and government. The core of population movement lies in the migrant workers and the flow of talents.

New economic geography believes that migrant workers can be included in the process of industrial agglomeration. Taking a metropolitan area as a unit, the migrant workers tend to be highly paid. When a large number of manufacturers gathered in a region due to unexpected factors, the demand for industrial workers will increase dramatically in the region, resulting in an increase in real wages, thereby attracting the influx of migrant workers. The influx of migrant workers will increase the demand for products in the region, while manufacturers will further expand the scale of production to attract more enterprises to join. In a metropolitan economic circle, the migrant workers will leave for the center city from “lamp shadow” areas because of wage and industrial gap.

The non-“lamp shadow” area is often rich in labor, the high quality of social and public resources provide a strong attractive force for talent, a large number of migrant workers have a strong desire into the big city. In the core city, there are more senior jobs. These positions need some professional knowledge and position technology. It has a high demand for talent. The demand for high-end job seekers and executive search business needs and the needs of enterprise development is highly consistent, maintaining a good three between the virtuous circles of supply and demand. This benign supply and demand relationship is updated rapidly, the development of diversification, only a steady flow of talent supply can satisfy the demand, which provides a wealth of opportunities for the inclusion of talent.

The number of floating population in China in recent years is shown in **Table 1**.

As can be seen from the **Table 1**, the separation of the population and the floating population from 2011 to 2014 in China has increased year by year. During the period of “12th Five-Year Plan period”, the floating population in China reached 253 million at the end of 2014. It is expected in 2020 that China’s mobile migration population, including now predicted to be settled in the city will gradually increase to 291 million, of which the transfer of agricultural population is about 220 million, the floating population between cities is about 70 million¹. During the period of “13th Five-Year Plan period”, the population will continue to gather along the coast, the sea and the railway areas. The population of mega cities will continue to grow as a result of the migration of the population. With the development of regional economic integration, the strengthening of economic ties between regions, the population flow between towns will become more and more active. At the same time, the age structure of population flow is also changing year by year, the scale of migrant children and the elderly is growing continually, the proportion of working age population decline in floating population, more and more families bring their spouses, children and the elderly to flow together, this situation is conducive to stimulating mega City’s related public services and social welfare policies.

3.3. Transportation Costs

The essence of the construction of metropolitan areas is to weaken the administrative

¹Cited from “Report on the development of China’s floating population (2015)”.

Table 1. The number of floating population. Unit: one hundred million people.

Year	Separation of the population	Migration population
2010	2.61	2.21
2011	2.71	2.30
2012	2.79	2.36
2013	2.89	2.45
2014	2.98	2.53

Cited from "Report on the development of China's floating population (2015)", National Health and Family Planning Commission of the People's Republic of China.

region, to strengthen economic ties from the regional perspective, and form the economic and market integration of situation of the development. After the formation of the metropolitan areas, the core city and the surrounding urban agglomeration are complementary in function and structure, and the cooperation between cities is more closely. Therefore, in the business, information, services, resources and other aspects, the two sides should strengthen ties. Based on this reality, it is supposed to reduce the cost of transportation, increase the intensity of traffic and improve the quality of traffic. It can be seen that the urban construction transportation network, which has the distribution of a wide range, reasonable structure, high efficiency and integration, plays an important role in supporting and promoting the development of metropolitan areas.

In the context of inter regional cooperation, we need to speed up the integration process of urban and other economic areas. In the metropolitan area of Yangtze River Delta as an example, we have built Ning-zhen-yang metropolitan area, Taihu metropolitan area, Hang-jia-hu metropolitan area, Shao-yong-zhou-tai metropolitan area and traffic integration is the best form for the reduction of transportation cost. In Ning-zhen-yang city as an example, it covers Nanjing, Zhenjiang, Yangzhou three cities globally, has an area of 17 thousand square kilometers. The purpose is to fully conduct the main functional areas planning, to promote the integration of space resources, to build a scientific and rational production with ecological living space layout, and to form the multi-level cities integrated development pattern.

The three cities of Nanjing, Zhenjiang and Yangzhou have close geopolitical, popularity dates, cultural similarities, also related to the development of Yangtze River Delta, with an important locational advantages node in the region. The three cities are historical and cultural cities, which have abundant tourism resources, good water transportation. It is a hotly contested spot for military strategists since ancient times. However, from an economic point of view, Nanjing is far better than Zhenjiang, Yangzhou, which is a top city in the Yangtze River Delta. No matter from the view of financial, personnel technological innovation, or the living environment, it is in the upstream branch level, even gradually replaces Zhenjiang and Yangzhou, which resulting in the "lamp shadow" phenomenon in this metropolitan area.

4. The Guiding Strategy of Easing the Problem of “Lamp Shadow”: A Case Study of the Yangtze River Delta

The degree of the economic development of the core city has a direct radiation influence on the surrounding city. But in a metropolitan area, the core city is limited. Then by extension, if a big metropolitan area consist of a number of small metropolitan areas, and every small metropolitan area has radiation effect on surrounding cities at the same time, then every small metropolitan city itself will formed the core-peripheral radiation by itself. So each city will be affected by internal and external double stimulus, which can avoid the congenitally deficient of the original city where located on the edge area of the metropolitan area. As a result, it will decrease phenomenon of “lamp shadow” and use their subjective initiative to promote small metropolitan area and absorb others advantages.

Transportation integration is the precondition of the economic integration, and the economic integration is the inevitable result of the traffic system integration. The development of traffic integration is conducive to the transfer and exchange of information, which can accelerate the flow of resources, reduce the cost of transportation, namely the cost of economic activities. Keep improving the transportation network will make transportation more convenient, and promote the metropolitan material distribution hub to be the connection to the different directions of the world for the Yangtze River Delta.

Although the Yangtze River Delta metropolitan area belongs to the developed area in China, which still exists phenomenon of “lamp shadow”. It is an inevitable phenomenon when we observe the process of transformation stage of the economic development and new system constructing. It cannot be avoided but we can alleviate it by taking guiding polices and corresponding measures. For example, it is always necessary by giving support in terms of policy and funding regulation by the government; or transferring industry, developing strategic resource and major projects; accelerating the construction of integrated transport system; strengthening the cultivation of talents; promoting the technological innovation; promoting the regional economic, social and environmental sustainability and integration.

4.1. The Implication of Successful International Metropolis Circles

From the view of the successful international metropolis circles, we can get some revelations of the coordinated development. Currently, the world has formed six major metropolitan areas. In addition to China, with Shanghai as the center of the Yangtze River Delta metropolitan area, there are five more successful international metropolis circles, as well as New York as the center of the Atlantic coast of the Northeastern United States Grand Metropolitan, with Chicago as the center of a large metropolitan area in Great Lakes, Tokyo as the center of Japan’s Pacific coast metropolis, London as the center of a large metropolitan area of England and Paris as the center of a large metropolitan area in northwestern Europe. The Metropolitan is an international economic, financial, and trade center which plays a huge role in promoting economic de-

velopment for the country. We can see that the industrial structure and spatial layout adjustment has been a century of history. It is important in the development process of a large metropolitan area and worth learning and reference.

A world-class metropolitan industrial layout is regular, they have well-developed transportation system, perfect industrial division of labor and rich scientific and technological innovations. However, even the best development of Shanghai in China, still exist shortcomings in technological innovation. The so-called scientific and technological innovation, including scientific research and technological innovation, will be the birth of a new mode of production and new way of life, also create a new business culture, with leading cultural development of mankind. Global technology innovation center must include these factors: technology-leading companies, world-class universities, venture capitalists, which all are in urgent need for talents. So high-quality education system is very important base for urban human capital accumulation.

World's most advanced large metropolitan urban always have corresponding development strategies and innovation path plan. For example, New York proposed the goal of "Digital New York" based on its active financial innovation and service innovation; while London had put forward to develop the creative industries as an innovative carrier, also strengthening the development of the biotechnology industry, and proposed to build innovative city slogan. These practices of advanced metropolitan areas show that the creative parks constructions have positive effect to improve the cities' scientific and technological innovation ability and further to promote regional economic development. For the state level, we should support encourage and support enterprises technological innovation in metropolitan area, so as to maintain constant turnover of metropolitan old and new industries, and to promote the sustainable development of metropolitan areas.

4.2. Enhance the Radiation Ability of Shanghai Metropolitan Area

The driving force of metropolitan radiation supplemented by optimization for industrial structure and configuration of capabilities is a major element to its functioning. In a large metropolitan area, the development of the core city will absolutely promote the evolution of the surrounding cities in medium and small scales in economical or technical even cultural ways. The Mid-Eastern China with unique geographical and climatic factors has attracted numerous human resources since ancient times, not to mention the importance of the metropolitan area of its Yangtze River Delta, which is the most developed economically and the most agglomerated urban area of this country, which has major big industries with strengths roundly. Till 2016, three provinces and a core city including Jiangsu, Zhenjiang, Anhui and Shanghai, alongside with 41 cities have finished a combination of the urban agglomeration area in the Yangtze River Delta with a relatively perfect transportation network and integrated infrastructure.

Metropolitan area is the economic center that can play a pivotal role in promoting economic progress of a country or a region. In the information age of economic globalization, only large metropolitans have a real strength to compete with each other, only

by developing a metropolitan can it get enough economic capital to accomplish the assemble of large-scale industries, gain top talents and complete infrastructures with international competitiveness. The Yangtze River Delta with Shanghai as a metropolitan center, affected surrounding cities in ways of economic, science, technology and talented people, absorbed a lot of foreign investments, exploited numbers of industrial and technical parks, increased intelligence input, then finally made it one of the most active region during China's economic reform and open process. Therefore, the Yangtze River Delta can attract more and more capital inflows with its advantages of talents resources and form a virtuous circle which is a goal of economic development in China and a template of other big metropolitans.

What is lacking for Shanghai is science and technology-leading enterprises, also lack of venture capitalists. And the biggest advantage for Shanghai is geographical advantages. The most important factor is location for the innovation and the urban development. The geographical advantage of Shanghai's location is the vital factor for sustainable development in the future. Therefore, as long as we cultivate strongly scientific and technological enterprises, Shanghai can be a considerable global center of technological innovation. Shanghai should pay more attention to scientific and technological development plan based on its own strengths and existing infrastructure conforming to the trend of the world metropolitan development.

4.3. Promote the Collaborative Development of Nanjing Metropolitan Area by Integrated Transportation System

To dispel the phenomenon of "lamp shadow", the official file—"integrated plan for the development of Ning-Zhen-Yang" was launched on August 22, 2014. This program aims at integrating the three cities into a combination system. The program also involves transportation, education, health, environment public services and some other aspects, putting forward the innovation of seven key aspects including infrastructure, industry layout, the innovation system, public service, balance between urban & rural areas, environment, and regional economic reform. Among them, the transportation network integration between the three cities ranks first. With the goal of traffic integration, the three cities should try hard to improve their efficiency and combine the high-speed rail and train, which aims to creating suitable and fast transport corridor for any conditions. It is also worth noting that seven Yangtze River bridges have formed the fast transport corridor, making it more convenient that the three cities could contact easily with each other.

No matter from the view of comprehensive resources or industrial development, the three cities can benefit from each other and the traffic network optimization is the prerequisite of promoting economy. As for intercity cooperation, the chemical industry in three cities should strengthen the collaboration and divide the recourses reasonably, which can help optimizing the industrial structure, promoting the industrial cluster upgrading, and achieving penetration cross each other at last. With regards to natural resources, the three cities are abundant in tourism resources. Based on the progress of

unified marketing, brand and propaganda promotion, the program can make the tourism circle among the three cities more famous around the whole world. For talents cultivation, there are many famous colleges and universities in this area, attracting numerous talented people because of the profound cultural background and strong scientific research force. The advantages above are totally based on the reduction of transportation cost, which is accord with the trend of the development of social economy. As long as the three cities can make the division and cooperation reasonably based on the complementary principle for each other, and do the plan together, they can achieve the integrated advantages of $1 + 1 + 1 > 3$.

5. Conclusions and Implications.

The metropolitan “lamp shadow” phenomenon is a popular and difficult problem, which needs inclusive development for different cities. It is extremely important to enhance regional innovation capacity and soft power based on China’s “new normal” economy for small-medium cities in metropolitan area. In this paper, we take the first nature and the second nature as research perspectives and construct a theoretical framework to analyze the “lamp shadow” phenomenon by using the gravity model and the new economic geography theory. Then we analyze the cause and the intrinsic mechanism of “lamp shadow” phenomenon in terms of increasing returns, population migration and transportation cost. In the end, a guiding strategy is proposed, based on a case study on the megalopolis of Shanghai and Nanjing in Yangtze River Delta, on how to ease the “lamp shadow” phenomenon by means of integrated transportation and upgrading metropolitan radiation force.

We get some interesting findings: it is not enough for the development of metropolitan area based on the original first and second natural advantages. Therefore, the re-discovery of first nature and re-creation of second nature are really important measures to reshape Chinese economic geography. For example, it is very important to excavate the natural advantage of non-mainstream industries in the field of “lamp shadow” area, or encourage more technological progress and application to promote the upgrading of industrial structure, and to improve the ecological niche position of inferior region in the economic geography of urban agglomeration from the view of spatial inclusiveness and institutional innovations.

The limitation of research is only discussed and explored in the theoretical view based on economics; the further research will be done from the perspective of empirical tests based on city level or county level data in the future.

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