Regional Economic Analysis Based on Big Data

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Abstract: The development of information technology changes the way of regional economics research and brings opportunities and challenges to regional economics research. This paper adopts data analysis method, literature research method, data analysis and other analysis methods, and takes the regional innovation capacity report 2019 issued by the national bureau of statistics as the entry point to analyze the current regional economic situation in China. On this basis, combined with the characteristics of the era of big data, the future regional economic research recommendations. According to the research results of this paper, the comprehensive evaluation scores of the top three regional innovation capabilities in 2019 are 59.49, 53.22 and 79.58, indicating that China's regional economy is still not coordinated with regional innovation, and promoting the coordinated development of regional economies is the top priority. The combination of regional economics and big data provides new opportunities for China's economic development. This paper aims to explore the research and innovation direction of regional economics from information asymmetry to data asymmetry, and put forward feasible Suggestions in theoretical and academic aspects and practical applications, so as to promote the coordinated development of China's regional economy.

1. Introduction

The arrival of the information age has brought convenience to people's life. People can use big data to collect information more conveniently and quickly, so as to make accurate decisions [1]. However, the era of big data has also changed the traditional research methods of economic statistics [2]. Based on this, big data economics has changed the traditional research methods of theoretical economics and applied economics [3]. If we can make full use of big data in the cloud, conduct detailed analysis on the structure and content of economic data and establish a systematic model, big data can make a great contribution to economic development [4].

In the past few decades, there have been many researches on big data and big data economics [5]. In 2016, the results of A statistical analysis report on big data by professor Kravchenko, n. A showed that the new data volume in China in 2010 was 250PB [6]. In 2018, the world economic forum released the report "big data big impact", which analyzed the impact of big data on the economy from biological, medical, security, financial services and many other aspects [7]. Some scholars have conducted research and analysis on urban economics under big data, so as to discuss how to better apply big data in the study of urban economics [8]. With the rapid development of reform and opening up, China has become the second largest economy in the world. However, due to China's vast territory, there are still uncoordinated development factors between regions, which need to be paid attention to [10].

By expounding big data and big data economics, the regional economy of China under big data can be analyzed in more detail. In this paper, combining with the present situation of regional economic development, and regional economic development level, explores under the large data, the traditional regional economics is facing what challenges, further study on large data of regional economics have what academic value and application value, how to make full use of big data to promote the coordinated development of economy in our country.

2. Concepts Related to Big Data and Regional Economics

2.1. Big Data

With the popularity of smart phones and the rise of mobile payments, data statistics and analysis are more convenient. From the price of a commodity to the number of individual steps taken each day to the GDP of each country, the fluctuations of global financial markets generate data at every moment. In August 2012, Gartner released the trend of technology life cycle, pointing out that big data has become a hot spot in the development of new technologies in less than two years, indicating the significant role of big data on the economy. Although there has been a lot of research on big data, there is no uniform standard definition in the academic world. Based on the characteristics of big data, this paper will define and describe big data, and add value based on the three characteristics defined by IBM. In other words, it believes that big data is volume, variety, velocity and valuable. These characteristics not only bring opportunities but also challenges to the development of economics.

2.2 Big Data Economy

Due to the huge impact of big data on the economy, in order to distinguish it from traditional economics, scholar Anand Rajarama invented a new term "Econinformatics" and regarded it as a new branch of economics. In general, big data economy refers to the emerging interdisciplinary discipline combining computer technology, information management technology and traditional economics, which requires a deep and comprehensive grasp of knowledge in various fields. In the context of big data economy, economists should not only study how to model, analyze and predict, but also systematically master disciplines including sociology, public administration and computer science.

2.3 Regional Economics

Regional economics is a branch of applied economics, which needs to comprehensively, macroscopically and dynamically analyze the economy within a certain spatial area, including regional economic development differences, regional industrial layout, regional government functions, regional coordinated development and other issues. Objectively speaking, although the research on regional economics has a long history, the research on issues such as how to promote the economic growth in the west while maintaining the coordinated development of the east and the west is still relatively theoretical and shallow, requiring further comprehensive research. Since the 1980s, linear science, game theory and chaos theory have been added to the study of regional economics, which has greatly promoted the development of regional economics and made a significant contribution to China's economic take-off. In the 21st century, information technology and big data are changing all aspects of the society, so the study of regional economics should also make some changes. Therefore, this paper aims to discuss the analysis of regional economics under big data, and put forward some reasonable Suggestions based on the analysis of the current regional economic phenomenon in China.

3. Research Design

Due to the large land area and numerous provinces in China, scholars often have different opinions when dividing regions. In this paper, based on the division of provinces and municipalities according to the national standard, combining with the division methods of geographical regions commonly used in regional economics, this paper adopts qualitative and quantitative methods such as data analysis, literature analysis and data analysis to discuss the current situation of regional economy in China. In addition, by analyzing big data and big data economics, this paper aims to explore the challenges and development opportunities faced by regional economics under big data. According to the China regional innovation capacity report 2019, regional scientific and technological innovation capacity refers to a region's ability to transform knowledge into new technologies, new services and new products. The system of regional innovation capacity plays an

important role in promoting regional economic and other development levels. The data used in this paper are from China statistical yearbook published by the national bureau of statistics, which is authoritative and accurate.

4. Regional Economics Under Big Data

4.1 2019 Regional Innovation Capability Analysis

(1) Overall analysis

The regional innovation capacity report of China in 2019 is shown in Figure 1, which shows that the comprehensive utility value of regional innovation capacity of Guangdong province continues to rank first, and the improvement pace of innovation capacity is significantly faster than that of other provinces and cities, with the leading edge continuously expanding. Beijing and Jiangsu came in second and third place, respectively, while Tianjin dropped, while Chongqing and Hubei both rose one place. Overall, the top 10 provinces remain largely unchanged from 2018, but the rankings have been adjusted.

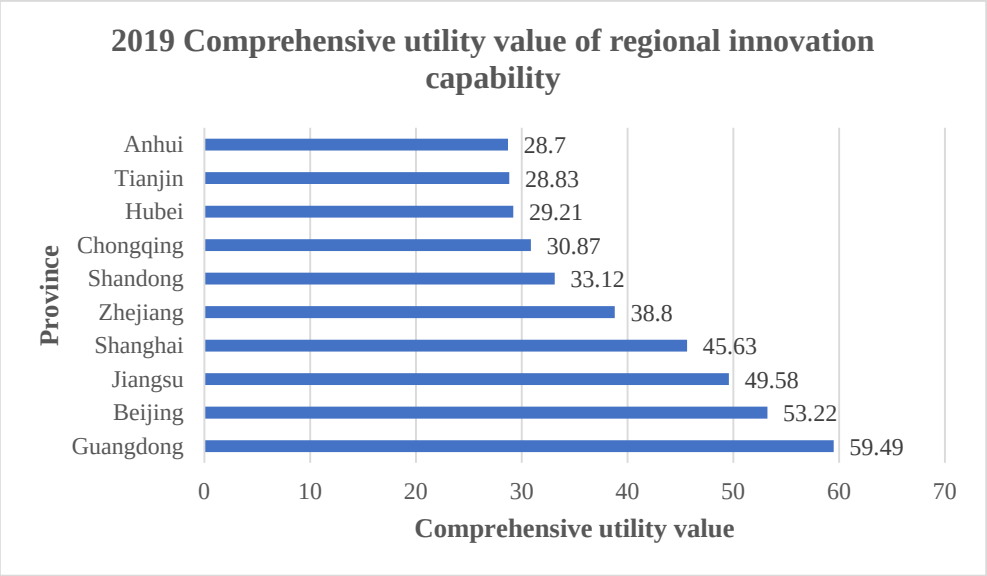

Figure 1. Comprehensive utility value of regional innovation capacity in 2019

(2) Comparative analysis of four municipalities directly under the central government

On the basis of the overall analysis of regional innovation capacity, this paper further compares and analyzes the regional innovation capacity of four municipalities directly under the central government, Beijing, Shanghai, Chongqing and Tianjin. As shown in Table 1, based on the comprehensive value of regional innovation capability, it is decomposed into four parts: knowledge creation, knowledge acquisition, enterprise innovation and innovation environment. Beijing's overall ranking and knowledge creation are the highest among the four municipalities, in part because of its large number of institutions of higher learning, which attract a large number of talents for scientific research and innovation. At the same time, as the political, educational and cultural center of China, Beijing has a large number of advanced high-tech enterprises, forming a good environment for joint innovation between enterprises, universities and research institutes. Shanghai, as one of China's modern cities, has the same obvious advantages, with high scores in the five fields. In addition to the index of knowledge acquisition, Tianjin ranked last in the other four indexes.

Table 1. Comparative analysis of innovation capacity of four municipalities

Composite Indicator	Beijing		Shanghai		Chongqing		Tianjin	
	Score	Ranking	Score	Ranking	Score	Ranking	Score	Ranking
Comprehensive value	53.22	2	45.63	4	30.87	7	28.83	9
Comprehensive indicators of knowledge creation	74.4	1	43.42	4	25.6	11	23.3	16
Comprehensive indicators of knowledge acquisition	49.36	2	58.46	1	20.79	9	23.93	5
Comprehensive index of enterprise innovation	44.53	4	41.76	5	34.08	8	29.62	11
Comprehensive indicators of innovation environment	52.01	2	39.17	4	25.1	10	23.37	14

(3) Comparison of the four provinces

It can be seen from the above comprehensive analysis that the comprehensive value, comprehensive index of enterprise innovation and comprehensive index of innovation environment of Guangdong province are the first. Modern cities represented by Guangdong and Shenzhen are important engines driving the innovation and creation ability of Guangdong province. As shown in Table 2, compared with Guangdong and Jiangsu, Shandong province lags behind in the five major fields. Taking Shandong and Zhejiang as examples, Shandong is one place behind in the overall ranking, with a gap of 5.68 points. Knowledge creation was 8 places behind, with a gap of 12.55 points. Enterprise innovation lags behind 3, with a gap of 6.23 points, narrowing the gap.

Table 2. Comparative analysis of regional innovation capabilities of the four provinces

Composite Indicator	Guangdong		Jiangsu		Zhejiang		Shandong	
	Score	Ranking	Score	Ranking	Score	Ranking	Score	Ranking
Comprehensive value	59.49	1	49.58	3	38.8	5	33.12	6
Comprehensive indicators of knowledge creation	47.16	3	48.49	2	36.38	5	23.83	13
Comprehensive indicators of knowledge acquisition	47.22	3	36.75	4	22.76	8	19.78	10
Comprehensive index of enterprise innovation	75.98	1	56.78	2	47.64	3	41.41	6
Comprehensive indicators of innovation environment	52.2	1	43.59	3	36.38	5	33.84	6

4.2. Regional Economics under Big Data

(1) The necessity of combining big data with regional economics

Through the above analysis and comparison of regional innovation capacity, it can be seen that China's regional economic development problems are still obvious, the regional economic development is not coordinated, the economic development gap gradually widening and other problems need to be balanced and solved. These differences are not only caused by the innate natural geographical environment, historical and cultural conditions, but also by the acquired industrial regional development policies and the regional division of labor and cooperation in the national economy. In China, the economic development in the eastern region and the coastal areas along the Yangtze river is rapid, but the economic development in the western region is slow, and

with the industrial transfer, the northeast region is in urgent need of relevant policy support. How to allocate resources rationally and how to use the central fiscal expenditure are all issues that need to be considered in regional economics. At present, the regional economics research is still relatively traditional, and the division of the index evaluation system is not scientific and comprehensive enough, which still needs continuous improvement. The combination of regional economics and big data shows the necessity. For example, the above ranking of innovation ability is a relative ranking of the region's innovation ability compared with other provinces and cities, not a direct measurement of the region's innovation ability. Although a province may have dropped in the national ranking, its innovation capacity may still be growing, but at a slower rate than that of neighboring provinces, resulting in a drop in the ranking. On the basis of big data, the application of more comprehensive and scientific models will make the evaluation of regional innovation ability more accurate.

(2) Suggestions on regional economics research model based on big data

Based on the discussion of the value of big data in the theory and practice of regional economics, this paper puts forward some Suggestions to better promote the development of regional economics, especially the research on the hot issues such as the coordinated development of regional economy and regional economic innovation. First, establish a national regional economic statistics platform and innovative strategic alliance. In the coordinated development of regional economy, the government plays an important role. Although each province has established an information and statistics system, the system of some regions is still not perfect, and the statistical indicators are not unified among different regions, which still need continuous improvement. Secondly, innovate the analysis model of regional economics. In the context of big data, many traditional regional economic analysis models are no longer applicable due to the "local all-like nature", dynamic and unstructured features of big data. As a result, regional economists need to work with statistical analysts to innovate models. Moreover, promote interdisciplinary talents cultivation in the research of urban economics, economics is essentially a process of data collection, analysis and processing, huge amounts of data analysis of large data taller to the requirement of economists ability, based on the essential knowledge of economics also need to computer science, management science, operational research, and social science knowledge. Finally, big data can be flexibly used to solve regional economic research problems. While big data brings challenges, it is more about motivation and opportunities. The Internet can be used to realize regional linkage, share high-quality resources and better serve regional economic development.

Conclusion

Under the background of big data, regional economic analysis needs to be improved, and it is necessary to make full use of big data to formulate more targeted and humanized policies for regional economic development. However, it should be clear that the basic motivation and root of regional economics research remain the same, and its purpose is still to promote the coordinated development of the economy. In the era of big data, the analysis of regional economics is more comprehensive, accurate and comprehensive, and the formulation of regional economic policies is more scientific.

References

[1]. Gutmann M P, Merchant E K, Roberts E. "Big Data" in Economic History[J]. Journal of Economic History, 2018, 78(01):268-299.

[2]. Dembitz? , Gledec G, Sokele M. An Economic Approach to Big Data in a Minority Language[J]. Procedia Computer Science, 2014, 35(35):427-436.

[3]. Swanson N R, Xiong W. Big data analytics in economics: What have we learned so far, and where should we go from here? [J]. Canadian Journal of Economics, 2018, 51(3):695-746.

[4]. Engels, Barbara. Detours on the Path to a European Big Data Economy[J]. Intereconomics,

2017, 52(4):213-216.

[5]. Kravchenko, N. A. Assessment of diversification in the regional economy (Case study of subjects of the Siberian Federal District)[J]. Regional Research of Russia, 2016, 6(3):203-213.

[6]. Zhang Q, Yang L T, Chen Z, et al. A survey on deep learning for big data[J]. Information Fusion, 2018, 42:146-157.

[7]. Swanson N R, Xiong W. Big data analytics in economics: What have we learned so far, and where should we go from here?[J]. Canadian Journal of Economics, 2018, 51(3):695-746.

[8]. Kebir L. SEMINAL STUDIES IN REGIONAL AND URBAN ECONOMICS: CONTRIBUTIONS FROM AN IMPRESSIVE MIND[J]. Papers in regional ence, 2019, 98(2):1261-1263.

[9]. Harris B. Urban, Rural, Regional, Real Estate, and Transportation Economics[J]. Journal of Economic Literature, 2018, 56(3):1161-1163.

[10]. Cai Y, Selod H, Steinbuks J. Urbanization and land property rights[J]. Regional ence and urban economics, 2018, 70(MAY):246-257.