ISSN: 2288-2766 © 2021 KODISA & EABEA.
http://eajbe.jams.or.kr
doi: http://dx.doi.org/10.20498/eajbe.2021.9.2.1

Efficiency Analysis of Social Security Expenditure in 31 Provinces and Autonomous Regions in China*

Lin-Lin ZHOU[1], Hyung-Ho KIM[2]

1 First Author Professor, School of Business, Huaihua University, Hunan, China.
35381581@qq.com

2 Corresponding Author Professor, Department of Air Transport and Logistics, Sehan University, ChoongNam, Korea.
hhkim@sehan.ac.kr

Received: December 04, 2020. Revised: February 02, 2021. Accepted: February 15, 2021.

Abstract

Purpose **–** The purpose of this study is to measure the efficiency of social security expenditure in 31 provinces, cities and autonomous regions in China and proposes corresponding improvement plans.

Research design, data, and methodology **–** The data were obtained from the statistical yearbook of each province. The BCC and CCR models of DEA model and Malmquist index are used to analyze the efficiency, and the input-output index is expanded.

Result **–** The results show that the social security performance of the Chinese government has improved on the whole despite the unbalanced development in different regions. Each region should look for strategies to improve the efficiency of social security according to its own problems. The study suggests that provinces affected by TCI should improve their internal environment, such as raising social security fund structure and strengthening fund supervision, to improve efficiency. Areas affected by TECI need to be more responsive to policy, socio-economic and technological development.

Conclusion **–** The research conclusion can provide reference for Chinese provinces to improve the efficiency of social security expenditure in the future. This study is not comprehensive enough in the selection of input-output indicators, which can be further expanded in the future.

Keywords: Social Security Expenditure, Efficiency, DEA, Malmquist Index, TECI, TCI

JEL Classification Code: C8, D6, D63, C88

* Acknowledgement: This study was supported by the Sehan University Research fund in 2021.

1. Introduction

Social security, by national legislation, actively mobilizes social resources in all sectors to ensure no income, low income, and citizens to survive unexpected disasters, safeguard laborers in her old age, unemployment, illness, injury, when the basic life is not affected, at the same time according to the economic and social development, gradually enhance the level of public welfare, improve the quality of national life. China's social security system has developed rapidly in recent years, which is reflected in the efforts to increase the capital input and coverage of social security, and to strengthen the introduction of social security system. China's fiscal expenditure on social security and employment from 2009 to 2018 (unit: RMB 100 million) is shown in figure 1. In these ten years, the social security expenditure showed a trend of constant growth.

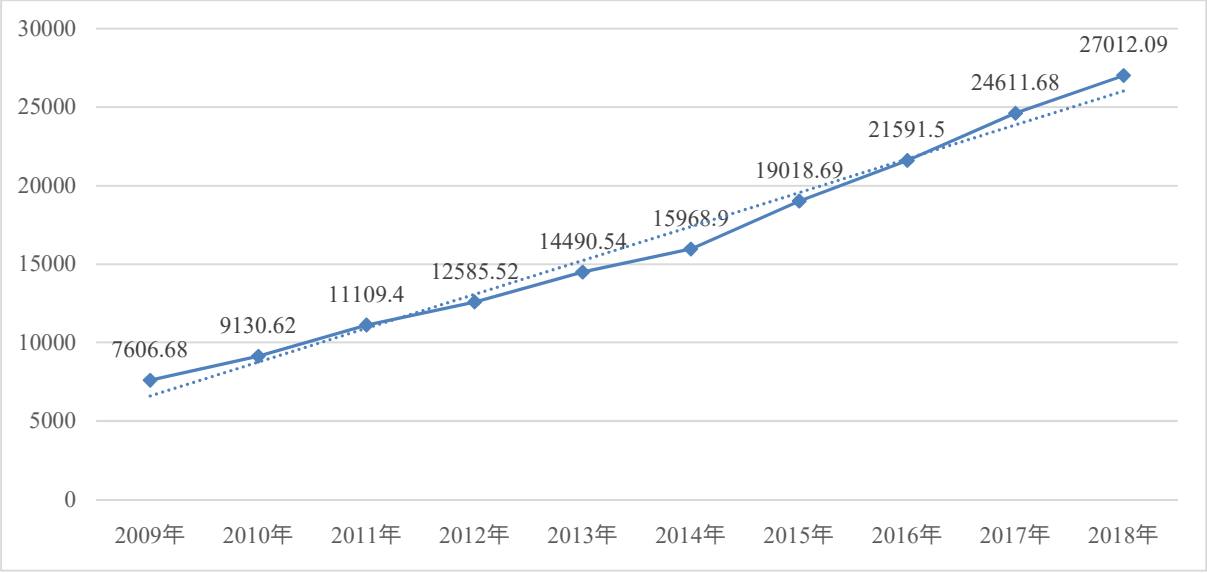

Figure 1: 2014-2018 State Financial Expenditure on Social Security and Employment

In 2018, for example, shows China's 31 provinces (unit: ten thousand yuan) per capital spending on social security, higher per capital spending is divided into two groups: the first group is the Beijing, Shanghai, Tianjin, this is because the economic developed area, and total investment is higher, while the second group of Qinghai, Tibet and other amount of per capita public expenditures in the western region is also high, this is because these areas of sparsely populated. The low level of per capita fiscal social security expenditure in the eastern provinces of Guangdong and Fujian is also closely related to the denser population in this region. Therefore, the difference in the scale of fiscal social security expenditure among provinces (cities and autonomous regions) is only a superficial phenomenon. The high level of social security expenditure in a region does not necessarily mean that the region is highly efficient in providing social security public goods and public services.

The purpose of this research is by choosing the appropriate input and output indicators, using DEA and Malmquist analysis method, efficiency and change of social security expenditure analysis and assessment, promote the development of the social security system, the realization of the fourth plenary session of the party's 19 "perfect universal social security system, strengthening to improve the system guarantee of the people's health level" grand goal. During the writing of this article, when the new coronary pneumonia was ravishing my country, I was lamenting my country's numerous disasters, but I would surely win, and my reverence for nature must be respected. China paid for the treatment of this epidemic, which is the "social security" of socialism. Only after the epidemic, the country will establish a more efficient social security system to promote the sound economic and social development. In the selection of input-output index, this paper comprehensively considers the relationship between various elements of social security, and selects two new indexes to expand on the basis of previous research.

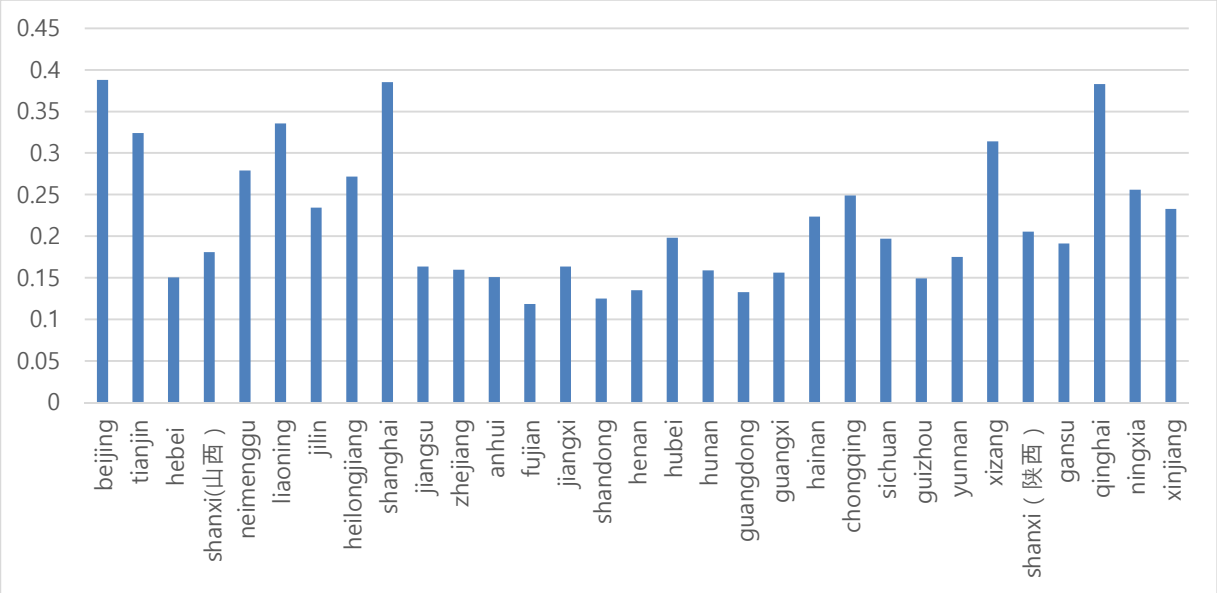

Figure 2: Per Capital Social Security Expenditure

2. Theoretical Background

2.1 Literature Review

The research on social security expenditure mainly adopts quantitative research method. First, the research on the efficiency of social security expenditure. The DEA-Malmquist index analysis method was used to empirically study the total factor productivity of social security in China, and it was found that the total factor productivity increased as a whole during the study period, with a relatively significant growth rate in the western region (Wang & Wang, 2014). By combining canonical correlation analysis with DEA to evaluate China's social security performance, DEA is effective in 80% of regional social security sectors, and still needs to be improved in another 20% or so regions (Luo & Chai,2010). Static and dynamic analysis was conducted on the efficiency of local governments' financial social security expenditure in 26 provinces (municipalities and autonomous regions) in China, and the efficiency of local governments' financial social security expenditure showed significant inter-provincial and regional differences (Zhu, 2016). Through the two-stage DEA model, the measurement and comparative analysis of the efficiency of social security expenditure in six provinces in central China found that the overall performance of social security expenditure in six provinces in central China was in a stable improvement state (Huang & Li, 2018). The second is to study the causes of social security differences. From the perspective of urban and rural differences, DEA tobit two-stage method was used to study the differences in the efficiency of China's urban and rural fiscal and social security expenditure and the reasons for them (Li & Xiong, 2016). Third, the study on the factors influencing the efficiency of social security expenditure.

Through the construction of the social insurance performance evaluation index system, it is found that the relationship between fiscal revenue decentralization and social insurance performance in different regions is negative, while the relationship between fiscal expenditure decentralization and social insurance performance in different regions is not obvious (Peng, 2016). The Tobit two-stage regression model was used to analyze the main factors influencing the input-output efficiency of social security in China. The results showed that the aging level, per capita GDP and government size were the main factors influencing the input-output efficiency of social security (He, 2015). In 16 cities in Anhui province during 2012-2015 basic input and output efficiency of social security situation and its influence factors for empirical testing, it is concluded that agricultural population, the aging degree and per capital are fixed number of years of the education, scientific research personnel per capital output of R&D and local fiscal revenue is the main factors influencing the basic input and output efficiency of social security (Zheng & Ding, 2017). Fourth, the impact of social security on economic development. DEA method was used to evaluate the efficiency of social security and employment expenditure in 30 provinces of China, and it was believed that the efficiency of social

security and employment expenditure had a significant promoting effect on economic growth (Liang & Zhang, 2019). It is believed that fiscal expenditure and fiscal expenditure structure have significant economic growth effect (Chen & Wang, 2014), and efficient fiscal expenditure is more conducive to rational allocation of resources, thus more conducive to economic growth (Zhang, 2017).

To sum up, first, in the existing research literature on the efficiency of social security expenditure in China, more studies are conducted on the efficiency of cross-sectional time. In this paper, the Malmquist index method is used to analyze the changes of efficiency, so that the efficiency value is comparable from year to year. Second, the breadth of index selection complements the existing literature. The deficiency of this paper is that the academic circle has been disputing about the statistical caliber of fiscal social security expenditure. In the selection of indicator variables, the scope of indicators covered in this paper is not very comprehensive, which may lead to certain deviations in the research results.

2.2 DEA Model

DEA Data Envelopment Analysis (DEA) is an efficiency evaluation method proposed by Charnes, Cooper and e. rodes in the 1970s.DMU (Decision Making Unit) refers to the Decision objective with lower input and higher output based on certain conditions. It reflects the Decision state and Decision scale of the whole set of Decision-Making units. Decision making unit (DMU) is an important concept of DEA, and the evaluation of input-output efficiency can only be carried out if the meaning of this concept is clarified (Charnes, Cooper & Rhodes, 1978). The DMU of this study is 31 provinces, cities and autonomous regions in China. DEA analysis of the two models is the CCR model and BCC model, CCR model is mainly used to measure the comprehensive efficiency of DMU under the scale reward, BCC model based on the hypothesis that the size of the variable remuneration, in the real society, the vast majority of decision making units is the size of the variable remuneration, so compared with the CCR model, using the BCC model to measure the efficiency of decision making units is more in line with the actual (Banker, Charnes & Cooper, 1984).

In DEA results, DMU with high relative efficiency (=1) was determined by comparing the ratio of input-output indicators, and was identified as DEA effective. DEA is a commonly used method to study input-output: Using data envelopment analysis (DEA) to study and analyze the input-output efficiency, it can be concluded that the input output efficiency of 50 listed companies is very different (Yan, Kim & Yang, 2020). Using six years of data from 2013-2018 and DEA-Malmquist index was used to analyze the efficiency of coastal fisheries production in 11 areas of China's coast (Li, Jeon & Kim, 2020). The three-stage DEA method is using on the green logistics idea, the efficiency of 29 listed logistics enterprises in China is analyzed (Qi., Chung & Kim, 2020). 31 provinces of China social security expenditure efficiency can be thought of as a question of relative efficiency measure of input and output, but the C2R model in the case of ordinary DEA method easy to ignore the elements of relaxation, and cause deviation of efficiency measure, for the sake of easy calculation, this research use Anderson and Petersen (1993) proposed by the DEA efficiency measurement model of super efficiency model to build the social security, as shown in formula.

$$\text{Min } \theta$$

$$s \cdot t \cdot \begin{cases} \sum_{j=1}^{m} \lambda_j x_{ij} + S_i^- = \theta x_{i0}, i = 1,2,\cdots,n \\ \sum_{j=1}^{m} \lambda_j x_{hj} + S_i^+ = y_{h0}, h = 1,2,\cdots,k \\ \sum_{j=1}^{m} \lambda_j = 1 \\ \lambda_j,\ S_i^-,\ S_i^+ \geq 0 \end{cases}$$

Where, x represents the input volume of the JTH decision unit; y represents the output of the JTH decision unit; λ_i is the weight coefficient; S + and S − represent relaxation variables and residual variables, respectively.

2.3 Malmquist Index

Malmquist index by the economics, the earliest statisticians. Malmquist index is decomposed into technical efficiency change index (TCI) and improvement of technical efficiency change index (TECI), Malmquist index is applied more widely used to evaluate efficiency of dynamic method, used to indicate the change of total factor productivity (MPI), the choice of decision-making units in the situation of production efficiency in the two periods before and after the change.

3. The Research Methods

3.1. Selection of Indicators

The following four indicators are selected in this paper: (1) social security and employment expenditure (RMB 100 million): it reflects the government's expenditure in social security and employment. (2) local financial expenditure on education (100 million yuan): education expenditure reflects government expenditure on education affairs. (3) medical and health expenditure of local finance (RMB 100 million): medical and health expenditure refers to the medical and health expenditure items within the general budget of local finance. Government spending on health care. (4) local government expenditure on housing security: expenditure provided by the government for low-income housing. The indicators (2), (3) and (4) of input are seldom used in the first study, especially the fourth indicator, whose selection criteria are mainly aimed at the logic of input-output indicators.

In the selection of output indicators, the main choice is social insurance, which refers to endowment insurance, medical insurance, unemployment insurance, industrial injury insurance and maternity insurance. This paper selects five indicators of 31 provinces in China: (1) the number of employees (ten thousand people) who participate in the basic endowment insurance at the end of the reporting period and are registered; (2) number of medical insurance (ten thousand) : the number of employees who participate in the national basic medical insurance at the end of the report and are registered; (3) number of people participating in unemployment insurance (10,000 people) : the number of people participating in national unemployment insurance at the end of the reporting period; (4) the number of people participating in the industrial injury insurance (ten thousand people) : the number of people participating in the national industrial injury insurance at the end of the report period; (5) number of participants in maternity insurance (ten thousand) : number of participants in national maternity insurance at the end of the report period. The standard that these 5 indexes chooses is the number of people is planted in different danger to cover a circumstance.

3.2 Data Sources and Research Objects

The data used in this study are from the statistical yearbook of China from 2014 to 2018. The DMU of this study is 31 provinces, municipalities directly under the central government and autonomous regions of China. DEA and malmquist indexes are used in the calculation process.

4. Empirical Analysis

All the data in this paper are from the company's annual reports published by the Shanghai stock exchange and Shenzhen stock exchange.

4.1 DEA Model Results Analysis

In this study, the input and output indicators of social security in 31 provinces, municipalities and autonomous regions of China from 2014 to 2018 were selected. First, DEAP software was used to calculate the efficiency of fiscal and social security expenditure in 31 provinces of China from 2014 to 2018. Table 1 shows the efficiency of fiscal and social security expenditure in the sample year. China's 31 provinces from 2014 to 2018, the most comprehensive technical efficiency and pure technical efficiency of the overall efficiency is on the rise, judging from the data: whether it is a comprehensive technical efficiency (CCR - O efficiency value in the table) or pure technical efficiency (BCC - O efficiency value in the table), Beijing, Guangdong, Liaoning and the efficiency of the four provinces of Zhejiang value is 1, that is efficient. The pure technical efficiency in the western region is relatively low, such as Gansu, which

was only 31.6% in 2014, 27.6% in 2015, 29.5% in 2016, 79.7% and 81.5% in 2017 and 2018, and Qinghai, which has the lowest and highest technical efficiency of 42.5% and 72.5%. Comprehensive technical efficiency can be further decomposed into pure technical efficiency and scale efficiency, that is, comprehensive technical efficiency = pure technical efficiency × scale efficiency. Pure technical efficiency and the comprehensive technical efficiency gap between the results of the province, mainly in Ningxia and Tibet the two western provinces, Ningxia efficiency of pure technical efficiency of the five years of data to 1, said efficient, comprehensive efficiency is only 66.1% to 71.2%, however, pure technical efficiency of Tibet also is 1, expression is effective, comprehensive efficiency is only 12% to 39.1%, this is because the vast and sparsely populated and the low level of economic development. To the comprehensive efficiency of 2018 data, the 31 provinces in mainland China in Beijing, Fujian, Guangdong, Guangxi, Hebei, Henan, Liaoning, Shandong, Zhejiang in nine provinces of social security expenditure is efficient (= 1), other 22 provinces area social security spending is inefficient, and regional score results differences.

Table 1: Analysis Results of DEA in 2014-2018

DMU	CCR-O					BCC-O				
	2014	**2015**	**2016**	**2017**	**2018**	**2014**	**2015**	**2016**	**2017**	**2018**
Anhui	43.00%	40.70%	44.20%	50.30%	92.70%	44.90%	42.60%	46.40%	51.40%	94.10%
Beijing	100.0%	100.0%	100.0%	100.00%	100.00%	100.00%	100.0%	100.00%	100.%	100.%
Chongqing	100.0%	100.0%	100.0%	94.50%	91.30%	100.00%	100.0%	100.00%	100.%	95.30%
Fujian	62.00%	80.20%	83.10%	100.00%	100.0%	86.70%	100.0%	100.00%	100.%	100.%
Gansu	28.60%	25.30%	26.60%	70.20%	72.30%	31.60%	27.60%	29.50%	79.70%	81.50%
Guangdong	100.0%	100.%	100.0%	100.00%	100.00%	100.00%	100.0%	100.00%	100.%	100.%
Guangxi	31.30%	29.80%	39.60%	87.80%	100.00%	34.20%	32.10%	42.20%	95.50%	100.%
Guizhou	25.30%	29.40%	29.90%	32.40%	97.10%	29.20%	36.00%	40.60%	37.70%	97.20%
Hainan	57.00%	55.50%	63.00%	62.20%	74.40%	100.00%	100.0%	100.00%	100.%	100.%
Hebei	54.70%	54.30%	100.0%	99.60%	100.00%	57.70%	56.10%	100.00%	100.%	100.%
Heilongjiang	75.80%	72.60%	77.40%	100.00%	90.20%	80.10%	76.20%	82.10%	100.%	92.50%
Henan	43.90%	46.00%	60.90%	100.00%	100.00%	44.10%	46.40%	62.70%	100.%	100.%
Hubei	59.70%	54.30%	54.00%	84.30%	89.70%	60.80%	55.30%	54.30%	84.90%	90.00%
Hunan	51.90%	56.80%	56.40%	98.10%	97.70%	53.50%	58.40%	57.80%	100.%	99.30%
Jiangsu	77.70%	77.40%	86.30%	99.30%	97.80%	78.30%	78.20%	91.40%	99.70%	100.0%
Jiangxi	40.80%	41.30%	51.70%	81.40%	91.20%	43.30%	44.20%	53.80%	85.40%	92.40%
Jilin	62.50%	59.60%	63.30%	68.40%	89.30%	70.50%	67.60%	70.20%	75.50%	96.50%
Liaoning	100.0%	100.%	100.0%	100.00%	100.00%	100.00%	100.0%	100.00%	100.%	100.0%
Neimenggu	40.70%	40.80%	45.60%	68.60%	65.70%	45.70%	43.90%	49.20%	73.90%	69.90%
Ningxia	71.00%	70.80%	72.60%	66.10%	69.00%	100.00%	100.0%	100.00%	100.0%	100.%
Qinghai	22.70%	24.40%	29.90%	46.40%	45.30%	42.50%	58.90%	53.30%	73.90%	67.70%
Shandong	64.50%	100.%	100.0%	100.00%	100.00%	64.70%	100.%	100.00%	100.%	100.%
Shanghai	88.70%	87.20%	91.70%	94.20%	89.80%	95.70%	94.20%	99.20%	98.40%	93.70%
Shanxi(陕西)	37.60%	38.00%	41.30%	51.80%	78.20%	39.30%	40.00%	44.00%	54.70%	81.70%
Shanxi(山西)	63.10%	62.10%	66.40%	95.80%	92.70%	71.80%	66.90%	72.10%	100.%	98.10%
Sichuan	62.80%	58.80%	79.40%	94.80%	99.80%	63.20%	59.40%	81.00%	97.40%	100.%
Tianjin	100.0%	69.40%	62.20%	74.10%	74.00%	100.00%	100.%	74.50%	100.0%	100.%
Xinjiang	41.60%	38.50%	47.10%	51.00%	74.40%	49.80%	45.90%	53.30%	59.20%	82.90%
Xizang	13.00%	12.00%	12.90%	12.70%	39.10%	100.00%	100.0%	100.00%	100.%	100.%
Yunnan	30.50%	31.30%	30.60%	66.20%	69.90%	31.80%	33.00%	32.00%	69.00%	72.90%
Zhejiang	100.%	100.%	100.%	100.%	100.00%	100.00%	100.0%	100.00%	100.%	100.0%

From the point of view of pure technical efficiency, Beijing, Fujian, Guangdong, Guangxi, Hainan, Hebei, Henan, Jiangsu, Liaoning, Ningxia, Tianjin, Shandong, Sichuan, Tibet, 15 provinces of Zhejiang region scale is efficient (= 1), the other 16 provinces pure technical efficiency difference as a result, it shows that the provinces in 2018 on the investment of social security, internal management is more effective, but there are differences in scope management.

4.2 Analysis of Malmquist Index Results

Efficiency of Chinese provinces of social security can be done in table 2 malmquist index results analysis, the MPI TCI and TECI, characterized by internal efficiency and external efficiency, can be found from table 2, the first: China's local government fiscal social security expenditure efficiency in 2014-2018 showed a trend of rising slightly and there is biggish difference between provinces, regions. Second, the reason for the slight upward trend of MPI is the low degree of technological progress and no significant improvement in the comprehensive technical efficiency.

Table 2: Analysis Results of Productivity in 2014-2018

DMU	2014/2015			2015/2016			2016/2017			2017/2018		
	TECI	TCI	MPI	TECI	TCI	MPI	TECI	TCI	MPI	TECI	TCI	MPI
Anhui	0.9258	0.9491	0.8787	0.8867	1.0882	0.9648	0.9431	1.1093	1.0461	0.9418	1.8305	1.7241
Beijing	0.6829	1	0.6829	0.7849	1	0.7849	1.0569	1	1.0569	1.0507	1	1.0507
Chongqing	0.7341	1	0.7341	0.7722	1	0.7722	0.9404	1	0.9404	0.9788	0.9529	0.9327
Fujian	0.7141	1.1538	0.8239	0.7689	1	0.7689	1.2301	1	1.2301	0.9466	1	0.9466
Gansu	0.9031	0.8707	0.7864	0.8729	1.0694	0.9334	0.9674	2.703	2.6149	0.9021	1.0234	0.9232
Guangdong	0.9028	1	0.9028	0.8347	1	0.8347	0.9003	1	0.9003	1.0898	1	1.0898
Guangxi	0.8689	0.9373	0.8144	0.8836	1.3151	1.1621	1.028	2.2642	2.3277	0.9441	1.0474	0.9888
Guizhou	0.7438	1.2333	0.9173	0.8349	1.1279	0.9417	0.8274	0.9278	0.7677	0.898	2.5789	2.3159
Hainan	0.8958	1	0.8958	0.9788	1	0.9788	0.8697	1	0.8697	0.8069	1	0.8069
Hebei	0.8481	0.9713	0.8238	0.9504	1.7839	1.6955	1.0045	1	1.0045	0.8805	1	0.8805
Heilongjiang	0.9459	0.9512	0.8997	0.9351	1.0772	1.0073	0.9868	1.2185	1.2023	1.133	0.9254	1.0485
Henan	0.9321	1.052	0.9806	0.841	1.3529	1.1378	1.1246	1.5943	1.7929	0.8758	1	0.8758
Hubei	0.9282	0.9083	0.8431	0.8991	0.9829	0.8837	1.0039	1.5639	1.57	0.9694	1.0596	1.0272
Hunan	0.8854	1.0903	0.9654	0.8968	0.9903	0.8882	1.0018	1.7295	1.7325	0.9291	0.9929	0.9225
Jiangsu	0.8721	0.9986	0.8709	0.8216	1.1683	0.9598	0.9685	1.0905	1.0562	0.9571	1.0033	0.9603
Jiangxi	0.9027	1.0212	0.9219	0.8952	1.218	1.0903	1.0075	1.5865	1.5983	0.8862	1.0821	0.959
Jilin	0.8877	0.9595	0.8518	0.9192	1.0379	0.954	0.9376	1.0762	1.0091	0.9876	1.2779	1.2621
Liaoning	1.0097	1	1.0097	0.9221	1	0.9221	1.0829	1	1.0829	1.0219	1	1.0219
Neimenggu	0.9464	0.96	0.9085	0.9119	1.1203	1.0215	0.95	1.504	1.4288	1.0492	0.9448	0.9913
Ningxia	0.9891	1	0.9891	1	1	1	1	1	1	1	1	1
Qinghai	0.7004	1.3846	0.9698	1.0461	0.9049	0.9466	0.8628	1.3869	1.1966	0.994	0.9163	0.9108
Shandong	0.9714	1.5451	1.501	0.8763	1	0.8763	0.9446	1	0.9446	0.9571	1	0.9571
Shanghai	0.8919	0.9838	0.8775	0.8676	1.0534	0.9139	0.9376	0.9922	0.9303	0.957	0.9519	0.911
Shanxi(陕西)	0.9123	1.0187	0.9294	0.9295	1.0994	1.0219	0.9073	1.2434	1.1282	0.9389	1.4932	1.4019
Shanxi(山西)	0.8602	0.9322	0.8019	0.923	1.0771	0.9942	0.968	1.3869	1.3425	0.976	0.9812	0.9576
Sichuan	0.9524	0.9399	0.8952	0.9068	1.3644	1.2372	1.0346	1.2021	1.2437	1.0202	1.0264	1.0471
Tianjin	0.7995	1	0.7995	0.9403	0.7454	0.7009	1.229	1.3416	1.6489	0.7993	1	0.7993
Xinjiang	0.8692	0.9215	0.801	0.8581	1.1608	0.9961	0.8874	1.1112	0.9861	0.9687	1.3998	1.356
Xizang	1	1	1	1	1	1	1	1	1	1	1	1
Yunnan	0.8794	1.0381	0.9129	0.9119	0.9692	0.8838	1.0195	2.1585	2.2006	0.8962	1.0568	0.9471
Zhejiang	0.7735	1	0.7735	0.8685	1	0.8685	0.9145	1	0.9145	0.9701	1	0.9701

The main reason why the comprehensive technical efficiency cannot be significantly improved is that the scale efficiency of local government's financial and social security expenditure is generally low and the pure technical efficiency has not been significantly improved. The following article will illustrate the three indicators respectively in graph form.

As shown in figure 3, TECI is relatively stable compared with TCI and MPI in terms of technical efficiency (TECI). In general, the technological efficiency of Tianjin, Fujian and Qinghai provinces fluctuates greatly and is greatly influenced by external factors, aiming at improving the social security environment. Such as per capital GDP, population size, population structure, population quality, government size, fiscal decentralization, etc.

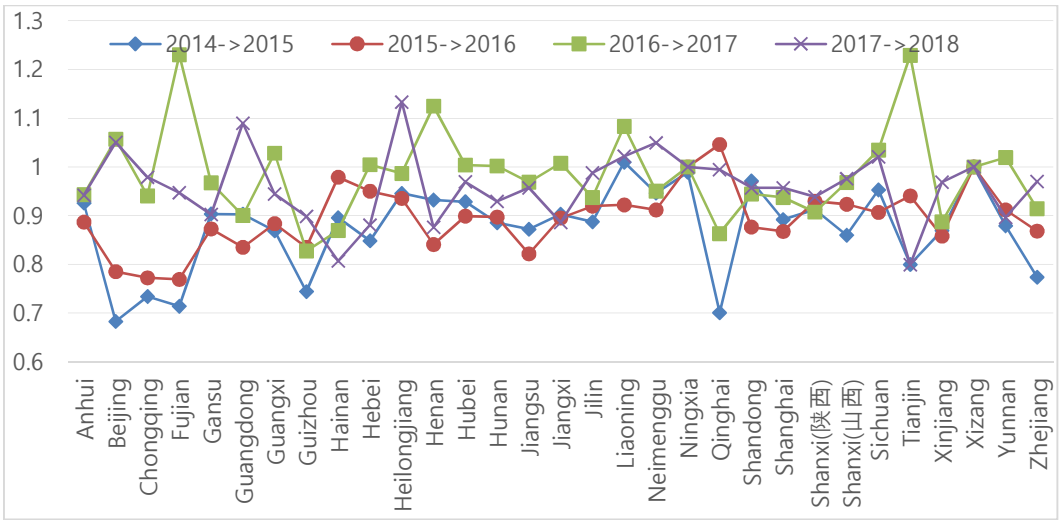

Figure 3: Variation Tendency of TECI

According to the data from TCI, technological changes in Chinese provinces and cities have the greatest impact on Gansu and Guizhou provinces, both of which belong to the underdeveloped western regions and should be committed to developing the economic environment and improving people's incomes.

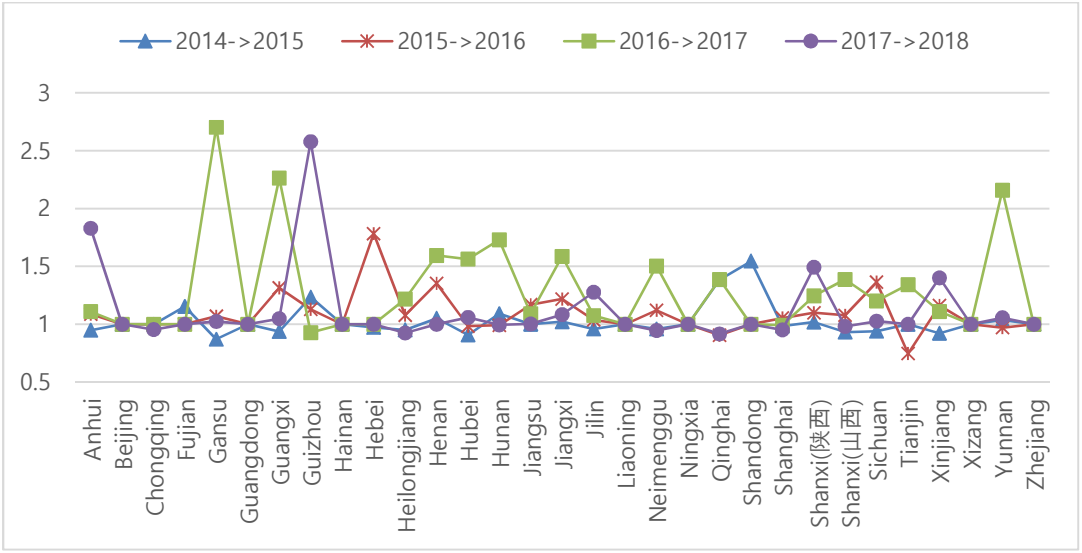

Figure 4: Variation Tendency of TCI

Due to the lack of technological innovation in social security management, the government should improve the scale of fiscal social security expenditure, the level of expenditure budget management and fund management, and the allocation capacity of social security resources.

In terms of the change of MPI index, Gansu, Guizhou and Yunnan had relatively large changes, while the MPI level of other provinces showed small fluctuations during the growth process. From a regional perspective, the efficiency of China's fiscal and social security expenditure varies significantly from region to region. The measurement results show that the efficiency of China's fiscal and social security expenditure is directly proportional to the degree of economic development.

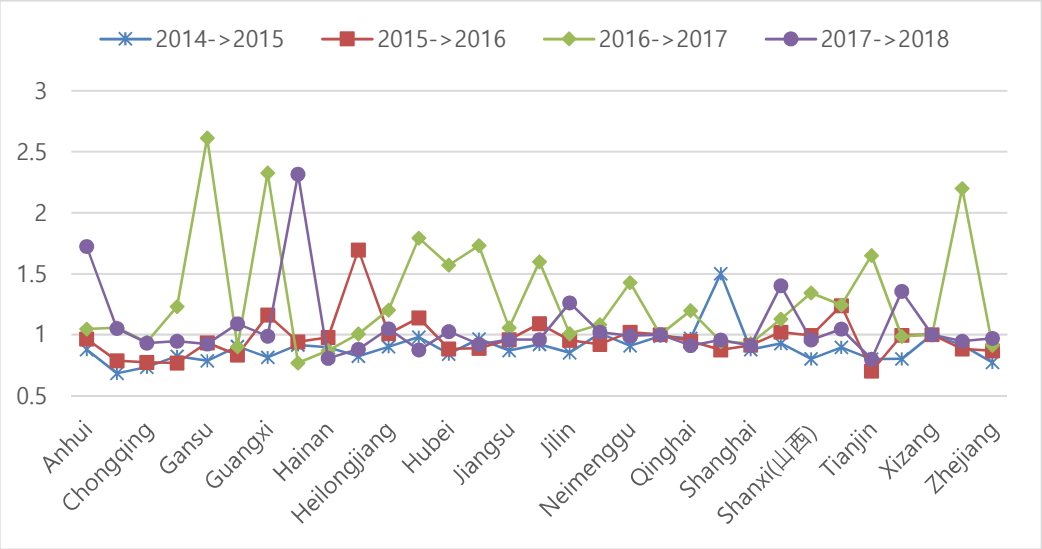

Figure 5: Variation Tendency of MPI

5. Conclusions

In the empirical analysis, this paper analyzed the efficiency of social security expenditure in 31 provinces and autonomous regions in China in 2014-2018 with DEA's CCR and BBC models and the malmquist index. It's concluded that:

On the macro level, although the social security performance of the Chinese government is relatively high on the whole, there is unbalanced development among regions. China's government's input in social security services is increasing, but its output is increasing slowly or even decreasing, which means that more attention must be paid to the productivity of government social security services, investment orientation of Government Social Security Service. From 2014 to 2018, the social security expenditure of four provinces, namely Beijing (1.00), Guangdong (1.00), Zhejiang (1.00) and Liaoning (1.00), was effective, while the relative efficiency of the three provinces, namely Tibet, Guizhou and Gansu, was relatively low. Each region should look for strategies to improve social security efficiency in line with their own problems. In view of the high pure technology efficiency and low scale efficiency of economically developed provinces, they should further improve their scale efficiency and narrow the gap between the current scale of social security expenditure and the optimal scale. In view of the high scale efficiency and low pure technology efficiency of economically backward provinces, the allocation and management level of social security funds should be further enhanced to promote the improvement of efficiency.

In terms of the overall trend, China as a whole showed an upward trend from 2014 to 2018.In view of the significant regional differences in the efficiency of current fiscal and social security expenditure, the state financial and security departments should pay more attention to further increasing the financial support to economically backward provinces, mainly western provinces, such as appropriately raising the transfer payment standards, in order to narrow the gap in the efficiency of fiscal and social security expenditure among regions.

Finally, this paper studies the performance evaluation of government social security, although the choice of indicators is only approximate, but for the analysis of government's social security service output, it is still of great significance to improve the performance of provinces and cities and the social security performance of autonomous local governments. The input-output index used in this paper can only partly explain the efficiency of social security expenditure. On the one hand, the choice of index is scientific, on the other hand, whether the index is comprehensive and which index can be used, the feasibility of the index has yet to be tested. The output index used in this paper cannot directly reflect the output effect of Government Social Security Service. This study is not comprehensive enough in the selection of input-output indicators, which can be further expanded in the future.

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