Study on the Evaluation of Financial Expenditure Efficiency in China's Medical and Health Field

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Abstract

In this paper, data envelopment analysis (DEA) is used as a tool to study the efficiency of medical expenditure. On the basis of static efficiency analysis, panel data is used to measure the change trend of medical expenditure efficiency in the provinces of China from 2007 to 2016 with Malmquist index. The study finds that the total factor productivity index of health expenditure in China has been below 1 since 2008, which indicates that the total factor productivity of health expenditure in China has been declining in recent years. In addition, through Tobit regression on the Malmquist index of medical input and output in 31 provinces in China in recent years, it can be found that improving the level of education and expanding the scope of financial power management of local governments contribute to the improvement of total factor productivity of medical and health expenditure.

Keywords

Health care; financial expenditure; efficiency; tobit.

1. Introduction

In August 2018, the General Office of the State Council promulgated the reform plan for the distribution of financial power and expenditure responsibility between central and local governments in the field of medical and health care, proposing further division of financial power in four aspects: public health, medical security, family planning and capacity-building. In September 2018, "Opinions of the Central Committee of the Communist Party of China and the State Council on the Comprehensive Implementation of Budget Performance Management" was officially published, which raised the budget performance management to an unprecedented height, and local governments will face higher performance requirements of financial expenditure. Under the background of the reform of fiscal and taxation system in the field of health care, the expenditure of financial funds in the field of health care should be paid more attention, and it is of great significance to study the expenditure efficiency of local governments in the field of health care.

At present, the main method of empirical research on the efficiency of government expenditure abroad is the frontier efficiency analysis method. This method can be further divided into parametric method and non-parametric method. Among them, the non-parametric method does not need to estimate the specific form and parameters of the function, including data envelopment analysis (DEA) and unbounded analysis (FDH). Data Envelopment Analysis (DEA) was first proposed by Farell in 1957. It was popularized by Charnes. Cooper and Rhodes. It has been widely used to evaluate the efficiency between departments. Charnes et al. used data envelopment analysis (DEA) to measure the efficiency of fiscal expenditure in some cities of China in 1978[1]. Borger uses data envelopment analysis to evaluate and analyze the efficiency of public goods supply of financial expenditure in Belgium Autonomous City[2]. Afonso and Fernandes used the two-stage framework of data envelopment analysis to study the efficiency of Portuguese local government expenditure. In the second stage, Tobit model was used to

study environmental factors [3]. Seifert uses data from various French government departments in 2008 to analyze the efficiency of government expenditure [4].

In the aspect of medical and health expenditure, domestic research mainly focuses on the analysis of current situation and policy recommendations. On the efficiency level of medical and health expenditure, most scholars use data envelopment analysis to measure the efficiency, and then use regression model to study the impact of environmental factors. Han Huawei and Miao Yanqing (2010) analyzed the provincial panel data through the D EA-Tobit model. The study selected the health expenditure in the financial budget as input variable, and took the number of health institutions, the number of health technicians and the number of beds in health institutions as output variables. The two-stage Tobit model was used to regressively analyze the efficiency [5]. Zhang Jianhua (2013) made an empirical analysis on the efficiency of medical and health resources through two-stage DEA model [6]; Liu Zimin, Zhang Xinzhu and Yang Dan (2014) used three-stage DEA model to analyze and evaluate the efficiency of medical and health input [7]. More and more scholars use the DEA model to analyze the efficiency of medical expenditure.

2. Current Situation Analysis

According to the data of the fiscal expenditure items of the National Statistical Yearbook in the last 10 years, it can be seen that the fiscal expenditure in the field of medical and health in China has increased year by year in the past 10 years. Among them, in 2016, it reached 1.3 trillion yuan, accounting for 7.0% of the total fiscal expenditure in that year. This proportion has also increased gradually in the past decade, reflecting that in the context of promoting medical reform, China has significantly increased financial investment in the field of health care in recent years.

According to the requirements of the World Health Organization, for developing countries, the total cost of public health should account for more than 5% of GDP. The proportion of medical and health expenditure in GDP in China is increasing year by year. By 2016, public health expenditure accounted for 6.22% of the total GDP, and government expenditure accounted for 1.87% of the total GDP.

Government expenditure on health accounts for about 30% of total health expenditure. In addition to government health expenditure, total health expenditure includes social health expenditure and personal health expenditure. Among them, social health expenditure mainly includes commercial medical insurance and social medical treatment. In 2016, the total social health expenditure and personal health expenditure were 1.9 trillion and 1.3 trillion respectively, accounting for 41.2% and 28.8% of the total health expenditure in that year. From the perspective of time, the proportion of government, society and individuals in total health expenditure has also changed greatly in recent years. Since the medical reform around 2000, personal health expenditure has been decreasing year by year, and the proportion of government health expenditure has increased significantly. This reflects the increase of government medical expenditure and the change of the overall expenditure structure in recent years.

Further decomposition of government expenditure in the field of public health shows that government expenditure on health care includes expenditure on health care, medical security, administrative affairs and population and family planning. The proportion of expenditure on health care has been decreasing year by year since the end of the last century, which is about 42.2% in 2016. Expenditure on health care increased year by year, reaching 46.7% in 2016, accounting for the largest proportion of all expenditures; expenditure on population and family planning decreased year by year, with the implementation of the second child policy, this proportion has dropped to 5.3%; and expenditure on administration has been relatively stable,

accounting for 5.8% of the total in 2016. This reflects that China has increased its investment in medical security in recent years, and a large part of it is used for medical insurance expenditure.

From the perspective of central and local government health expenditure analysis, we can see that under the division of central and local financial powers, almost all of the medical and health expenditure comes from local. From 2007 to 2016, China's central level medical and health expenditure was less than 10 billion yuan, accounting for an average of 1.2% of the total financial expenditure, and most of the growth of medical expenditure and investment came from local governments. Therefore, the study of China's financial expenditure in the field of health care should mainly focus on local finance. In addition, the expenditure of local governments in the field of health care has a significant growth trend, which is far faster than the growth rate of GDP, and the growth trend is an approximate straight line. It reflects that in recent years, the investment of local finance in the field of health care has been increasing, and the growth rate is relatively stable.

From the regional point of view, the medical and health expenditure of different regions in China has great regional differences. According to the ratio of fiscal and health expenditure to the local permanent population in 2016 in the National Statistical Yearbook, the per capita medical and health expenditure of different regions can be obtained. It can be seen that the western region actually invests the most in per capita expenditure, followed by Beijing and Shanghai, with significant differences in medical expenditure between regions. This reflects the concentration of medical resources in the first-tier cities in China, and the per capita investment of medical resources in the western region is not low. However, due to the sparse population and the scattered distribution of medical institutions in the western region, the per capita medical cost may also increase to some extent.

According to the statistics of the changing trend of the number of health technicians, the number of beds in health institutions and the total number of health institutions in China in recent years, we can see that the number of beds of health technicians and health institutions has increased year by year with the increase of financial expenditure in China, and the growth rate has remained stable. However, the number of health institutions has not changed much, reflecting that China's financial input is mainly used to expand the scale of existing health institutions.

From the above analysis, we can see that the current financial management in the field of health care in China mainly has the following problems: the scale of total expenditure in the field of health care is relatively small, lower than the world average level; the proportion of government expenditure is relatively small, there is still a larger room for improvement; the imbalance in the field of health expenditure among regions is more serious, including Beijing, Shanghai and other places. There is an excessive concentration of medical resources, and the per capita expenditure has remained relatively large; the proportion of central expenditure is relatively low, and the division of central and local powers makes it difficult for local financial resources to cover project expenditure.

3. Evaluation of Expenditure Efficiency

3.1. Evaluation Method of Efficiency

Data Envelopment Analysis (DEA) is an efficiency evaluation tool based on linear programming. It measures and ranks the performance of different organizations by calculating input-output ratio. The basic models of DEA mainly include C^2R models, BC^2 models and so on. Essentially, it is to use linear programming to obtain the optimal solution of the target decision making unit. Based on the C^2R model, the comprehensive efficiency is decomposed into pure technical efficiency (pec) and scale efficiency (sec). That is to say, the comprehensive efficiency is equal

to the product of pure technical efficiency and scale efficiency. In addition, Malmquist productivity index model will be used to measure the changes of total factor productivity (tfp), technological progress (tec) and technological efficiency (eff) in different periods.

The selection of index variables should follow the availability, comparability and scientificity, so as to better measure the relationship between output and input. At present, in the analysis of the efficiency of medical and health expenditure, it is a common practice to measure the output variables of medical and health expenditure by three indicators: the number of health technicians, the number of beds in health institutions and the number of health institutions. Based on the statistics of the number of health technicians, beds and health institutions in China in recent years, it is found that the three indicators are increasing year by year as a whole, which is consistent with the direction of the change of medical and health expenditure in China. Therefore, with the continuous increase of medical and health expenditure in China, the corresponding output is also increasing. Because this paper aims at the efficiency of medical expenditure, the input variables are selected from 2007 to 2016. The output variables refer to the research results of previous scholars, and select three indicators to measure the output of local government health care: the number of health technicians, the number of beds in health institutions and the number of health institutions. This selection not only draws on the theoretical experience of previous researchers, but also provides a guarantee for data availability.

In order to meet the availability of data and to better measure the effect of health care reform in recent years, the variable data in this paper are panel data from 2007 to 2016, which are derived from China Statistical Yearbook, China Health Statistical Yearbook and Wind database. The software of DEAP 2.1, Frontier 4.1 and Excel 2016 were used for analysis.

3.2. Static Efficiency Analysis

In this section, we use the output-based BC^2 model to analyze the selection of the model and measure the input to maximize the output. The results can be expressed by comprehensive efficiency, pure technical efficiency and scale efficiency. Among them, the comprehensive efficiency reflects the overall efficiency level of the decision-making unit, whose value is equal to the product of pure technical efficiency and scale efficiency. The BC^2 model further divides the comprehensive efficiency into two parts. The pure technical efficiency is used to measure the management level of each decision-making unit. The greater the pure technical efficiency, the better the management level of input and output. The scale efficiency is used to measure the distance between each decision-making unit and the optimal production scale. The larger the scale efficiency, the closer the production scale of the decision-making unit is to the optimal one. In this section, the input-output variable values of 2016 provinces are solved by DEAP 2.1, and the efficiency results are as follows:

Table 1. Efficiency Value of Provinces in 2016

region	region	Comprehensive efficiency	pure technical efficiency	Scale efficiency	Scale reward	Comprehensive efficiency ranking
Hebei	East	1	1	1	-	1
Shanxi	Central section	1	1	1	-	1
Liaoning	Northeast	1	1	1	-	1
Hunan	Central section	0.903	1	0.903	drs	4
Shandong	East	0.899	1	0.899	drs	5
Zhejiang	East	0.883	0.951	0.929	drs	6
Heilongjiang	Northeast	0.874	0.886	0.986	irs	7
Shaanxi	West	0.837	0.865	0.968	drs	8
Sichuan	West	0.811	1	0.811	drs	9
Jiangsu	East	0.803	0.886	0.906	drs	10
Henan	Central section	0.779	0.974	0.799	drs	11
Xinjiang	West	0.739	0.76	0.971	irs	12
Gansu	West	0.727	0.756	0.961	irs	13
Hubei	Central section	0.723	0.822	0.88	drs	14
Inner Mongolia	West	0.688	0.696	0.989	irs	15
Guangxi	West	0.686	0.727	0.943	drs	16
Tibet	West	0.679	1	0.679	irs	17
Anhui	Central section	0.678	0.743	0.911	drs	18
Jilin	Northeast	0.674	0.687	0.982	irs	19
Guangdong	East	0.657	1	0.657	drs	20
Beijing	East	0.651	0.676	0.962	drs	21
Jiangxi	Central section	0.646	0.647	0.998	drs	22
Fujian	East	0.644	0.664	0.969	drs	23
Chongqing	West	0.623	0.639	0.974	drs	24
Ningxia	West	0.604	1	0.604	irs	25
Guizhou	West	0.595	0.631	0.943	drs	26
Yunnan	West	0.592	0.675	0.877	drs	27
Hainan	East	0.558	0.738	0.756	irs	28
Tianjin	East	0.517	0.559	0.926	irs	29
Shanghai	East	0.515	0.532	0.967	drs	30
Qinghai	West	0.455	0.653	0.697	irs	31
average value		0.724	0.812	0.898		

From the perspective of comprehensive efficiency, the average comprehensive efficiency of all provinces is 0.724. Hebei, Shanxi and Liaoning ranked the top three with efficiency values of 1. All provinces can be divided into eastern, western, central and northeastern provinces

according to the calibre of the National Bureau of Statistics. Among them, the average comprehensive efficiency of northeast provinces is the highest, 0.849; that of central provinces is the second, 0.788; that of western provinces is the lowest, 0.670; and that of eastern provinces is 0.713, which is lower than the national average. From the regional differences, the comprehensive efficiency variances of the eastern, central, western and northeastern regions are 0.030, 0.019, 0.011 and 0.027, respectively. It can be seen that the comprehensive efficiency differences of the eastern 10 provinces are the greatest, while the differences of the western 12 provinces are the smallest. On the surface, the comprehensive efficiency of western provinces is generally at a low level, while the eastern developed provinces differ greatly, including Hebei, which ranks first in the comprehensive efficiency, and Shanghai, which ranks second to last.

From the perspective of pure technical efficiency, the management level of medical and health expenditure funds in different regions can be ranked: Hebei, Shanxi, Liaoning, Hunan, Shandong, Sichuan, Tibet, Guangdong and Ningxia are all 1, indicating that their management level is relatively better. Among them, Tibet, Guangdong and Ningxia have low comprehensive efficiency ranking, which indicates that the reason for their inefficiency is not caused by the management level of medical expenditure funds, but can be improved by adjusting the scale of production and other means. By dividing and calculating the average value according to the region, we can get the average value of purified technology efficiency in the eastern, central, western and northeastern regions are 0.801, 0.864, 0.784 and 0.858, respectively. The level of purified technology efficiency in the central region is relatively optimal, followed by the northeast, Eastern and Western regions. This is similar to the ranking of comprehensive efficiency, and to some extent reflects that the management level of the region with the highest efficiency of medical expenditure is also relatively better. The variances of pure technical efficiency in the east, the middle, the West and the Northeast are 0.035, 0.023, 0.021 and 0.025, respectively. From this we can see that the eastern provinces still have the greatest differences in management level, while the western provinces have the smallest differences in management level.

From the point of view of scale efficiency, we can see the reason that the comprehensive efficiency is relatively low besides the management level. From Table 1, we can see that the ratio of scale efficiency of Hebei, Shanxi and Liaoning provinces is 1, that is, the production scale level has reached the optimal level. In addition, Table 1 also reflects the type of scale reward in the current period of the decision-making unit. The DRS in the table represents diminishing returns to scale, while the IRS represents increasing returns to scale. When scale returns increase, it means that the scale of investment should continue to expand in the current period. When scale returns decrease, it means that the scale of investment should be reduced. When scale efficiency equals 1, it means that scale returns reach the optimal level. Therefore, it can provide reference for improving the efficiency of scale in various provinces.

3.3. Dynamic Efficiency Analysis

At present, Malmquist productivity index model is the mainstream method to study the dynamic change of efficiency value. It was put forward in 1953. At first, it was mainly used to measure the change of productivity. Since then, it has been widely used in combination with DEA model. In the Malmquist model, total factor productivity (TFP) is used to measure the economic growth brought about by technological progress, which can be decomposed into comprehensive efficiency and technological change. Among them, PTEC represents pure technical efficiency, SEC represents scale efficiency, the product of which is comprehensive efficiency; TC represents technological change, and the product of the above three is total factor productivity. The efficiency of technological change can reflect the movement of labor frontier. Studying the total factor productivity is helpful to analyze the contribution of various factors. In this paper, Malmquist productivity index model is used to measure the dynamic efficiency of

panel data. Although the specific efficiency value of each year can not be obtained, the comparison in different periods is more scientific.

In the process of dynamic efficiency analysis, many scholars neglect that input-output factors are influenced by inflation factors. In order to better measure the output of medical and health expenditure, this paper considers the inflation rate and adjusts the nominal medical expenditure to better measure the change trend of efficiency under the same price level.

According to the value of inflation rate, the current fiscal expenditure is converted. The Malmquist index of input and output of provinces from 2007 to 2016 is analyzed by using DEAP 2.1. The results are as follows:

Table 2. Means of Malmquist productivity index for each year

Particular year	Comprehensive efficiency	Technological change	pure technical efficiency	Scale efficiency	Total factor productivity
2008	1.049	0.788	1.06	0.989	0.827
2009	0.979	0.758	0.965	1.014	0.742
2010	1.04	0.895	1.063	0.978	0.93
2011	1.086	0.8	1.036	1.048	0.869
2012	1.01	0.961	0.999	1.011	0.971
2013	1.004	0.945	1.007	0.997	0.949
2014	1.015	0.849	1.017	0.999	0.862
2015	0.941	0.94	0.954	0.986	0.884
2016	0.984	0.979	1.005	0.979	0.964
average value	1.011	0.876	1.011	1	0.886

Total factor productivity (TFP) represents the distance from the production frontier, with a value greater than 1, indicating an increase in TFP and a decrease in TFP. From the result, from the time point of view, China's total factor productivity index has been in the level of less than 1 since 2008, with an average decline of 11.4%. It shows that the total factor productivity of medical expenditure in China has been declining in recent years.

As can be seen from the above chart, total factor productivity has been below 1 level, that is, total factor productivity has been declining in recent years. The decline rate showed a gradual downward trend, reaching the minimum of 2.9% in 2012.

Based on this, we can further explain the reason why the total factor productivity of medical expenditure in China has been declining year after year. The comprehensive efficiency in the field of health care in China is at a high level, with an average annual increase of 1.1%. Therefore, the decline of total factor productivity is not caused by insufficient utilization of technology, but by technological changes. By observing the trend of technological change, we can find that the trend of technological change is basically consistent with that of total factor productivity, and the average value of technological change is at a low level, with an average annual decline of 12.4%. From this we can see that technological progress and lack of innovation are the main reasons for the decline of TFP in successive years.

In recent years, the average total factor productivity of all provinces is less than 1, that is, the total factor productivity of all regions is in a downward trend. The precipitation level in Beijing, Zhejiang and Tibet is relatively low. It can be found that the decline in Western and eastern regions is relatively small compared with that in central regions, and there is a significant difference between regions.

Total factor productivity can be expressed by the product of comprehensive efficiency and technological change. Over the past 10 years, the average value of China's comprehensive efficiency is more than 1, which has played a significant role in improving efficiency. Since 2015, China's overall efficiency has shown a downward trend, with an average value of 0.984 in 2016. Further analysis of the comprehensive efficiency shows that the volatility of China's comprehensive technical efficiency is relatively large, which has increased significantly in 2010 and 2011, and then began to decline. The author analyses that this phenomenon may be related to the medical reform in 2009. The implementation of the new health care reform in 2009, to some extent, has played a significant role in promoting the upgrading of medical facilities and technicians, but the effect is gradually difficult to maintain with the weakening of the policy effect. The average value of pure technical efficiency is 1.011, and the average value of scale efficiency is 1. It can be seen that pure technical efficiency is the main reason for the improvement of comprehensive efficiency, that is, the improvement of technical management level in the field of health care of local governments in China promotes the improvement of comprehensive efficiency. However, the scale efficiency remains unchanged, indicating that the scale of expenditure in the medical field has not had a significant impact on efficiency in recent years.

4. Analysis of Influencing Factors

4.1. Model Selection

Most scholars use SFA stochastic frontier model or Tobit model to analyze the factors affecting efficiency results. In 1999, Fried et al. used Tobit regression model to eliminate the influence of environmental factors on efficiency. In 2002, Fried et al. further separated the effect of random noise on efficiency by means of SFA regression model, which is called three-stage DEA model in China. In view of the fact that the S FA stochastic frontier model is more in-depth in the analysis of the factors affecting efficiency, this section first explores the applicability of the stochastic frontier model.

The relaxation variables are further calculated according to the efficiency results of the previous calculation, the unilateral generalized likelihood ratio test results are 2.92, and the critical value is 7.045 at the 5% level according to the saliency table, thus rejecting the original hypothesis that there is no inefficiency term and proving that it is not applicable to the SFA model. Therefore, this paper will use Tobit model for regression analysis.

4.2. Selection of Variables

In the selection of independent variables, we mainly consider economic, social, institutional, environmental and other factors. Using GDP per capita to measure the local economic level, population density to measure the local population distribution, illiteracy rate to measure the educational level of the local population, urbanization to measure the local environmental factors. In addition, fiscal decentralization indicators are added to measure the financial management of local governments.

This paper chooses the ratio of provincial per capita expenditure to central per capita expenditure to show the degree of fiscal decentralization. There are three advantages of this choice. On the one hand, the use of expenditure indicators can better explain the efficiency of medical and health expenditure. On the other hand, the selection of central expenditure at the corresponding level on behalf of the central government's fiscal concentration avoids the impact of the general budget of each province on total expenditure. In addition, the selection of per capita indicators can effectively eliminate the impact of population differences in each province. The level of fiscal decentralization indicators can measure the scope of work of local governments. The larger the fiscal decentralization indicators, the more work the local government undertakes, the more separation of powers.

To sum up, the explanatory variables are GDP per capita, illiteracy rate, urbanization rate, fiscal decentralization index and population density. The data collected ranged from 2007 to 2016. The calculation methods of specific indicators are as follows:

Table 3. Selected Independent Variables and Calculated Calibration

Independent Variable	Computational aperture
capita gdp	GDP/Permanent Resident Population (Unit: yuan/person)
illiteracy rate	The proportion of illiterate population aged 15 and over (Unit:%)
Urbanization rate	Permanent Resident Population in Towns/Total Resident Population in the Area (Unit:%)
Fiscal Decentralization Index	(General Budget Expenditure of Local Finance/Permanent Resident Population)/(Central Level Expenditure/Total Population) (Unit:%)
Population density	Permanent population/total local area (Unit: person/square kilometre)

4.3. Regression Analysis

In the unit root test of panel data, LC test of the same root unit test and Fisher-ADF test of different root unit test can generally be used to test variables. If both tests reject the original hypothesis (P less than 0.05), the variables can be considered stable. The stationarity test of the variables from 2008 to 2016 shows that the sequence of GDP per capita and population density is not stable. For the first-order difference of the two variables, the test results are as follows (P value in parentheses). It can be found that all variables are stable. Therefore, this paper chooses Malmquist results as dependent variables, and takes per capita GDP growth rate, population density growth rate, illiteracy rate, urbanization rate and fiscal decentralization index as independent variables, which are expressed by mal, rjgdp, rkmd, wml, czhl and czfq respectively.

Table 4. Stationarity test results

Variable name	ADF - Fisher Chi-square	Levin, Lin & Chu t*
mal	144.398（0.000）	-14.289（0.000）
rjgdp	104.655（0.001）	-17.485（0.000）
rkmd	140.784（0.000）	-27.134（0.000）
wml	249.105（0.000）	-25.826（0.000）
czhl	145.192（0.000）	-8.266（0.000）
czfq	105.211（0.001）	-14.644（0.000）

After the model regression, the following results can be obtained:

Table 5. Regression results of Tobit model

Explanatory variable	Model
illiteracy rate	-0.006259 (0.0018)
Urbanization rate	-0.000855 (0.3215)
Fiscal Decentralization	0.011531 (0.0000)
Per capita GDP growth rate	1.30E-06 (0.6253)
Population Density Growth Rate	-0.000355 (0.4417)
Constant term	0.902159 (0.0000)
log likelihood	234.2195
AIC	-1.832415
SC	-1.733246

The impact of illiteracy and fiscal decentralization on total factor productivity is significant at the level of 5% (P value in parentheses), while urbanization rate, per capita growth rate of GDP and population density growth rate are not significant. According to the above results, illiteracy rate is negatively correlated with total factor productivity (TFP). That is, the higher the illiteracy rate, the lower the TFP, the higher the local illiteracy rate by 1 percentage point, which will lead to a decrease of total factor productivity by 0.6% in that year. This reflects the positive effect of education on efficiency. Improving the local education level can effectively improve the efficiency of the local medical and health fields. This conclusion is basically consistent with the views of many scholars, that is, the improvement of education level can significantly promote local residents'awareness of the level of local medical services, thus encouraging local officials to invest more in medical and health undertakings. The good education level of officials is also conducive to giving full play to their ability to improve TFP in the field of health care. Therefore, in the long run, improving local education and education can significantly improve the efficiency of local health expenditure.

Fiscal decentralization has a significant positive impact on efficiency. Every 1 percentage point increase in fiscal decentralization index will increase total factor productivity by about 1%. This reflects that the greater the scope of local management, the greater the efficiency in the field of health care. Expanding local financial autonomy will help to improve the input-output ratio and promote the growth of the efficiency of medical expenditure production. There has always been controversy about the impact of fiscal decentralization on expenditure efficiency. According to the empirical results of this paper, we can roughly explain the following: the higher the degree of fiscal decentralization, the greater the distribution power of local resources, and because local governments are more familiar with the medical needs of local residents, this power also helps local governments to improve efficiency in the field of medical and health expenditure. Therefore, by increasing local government expenditure on health care, it helps to improve the efficiency of local health expenditure.

5. Conclusion

According to the above analysis, we can see that the efficiency level between regions in China is inconsistent, and the static efficiency of the eastern and northeastern provinces is higher than

that of the western regions. In terms of time dimension, the efficiency of expenditure in China's medical field has gradually declined in recent years, probably because the government did not adopt a more scientific performance appraisal mechanism when it increased its financial expenditure in the field of medical and health. But at the same time, the downward trend has eased in recent years. The lower level of total factor productivity is mainly due to technological changes, not the inadequate use of existing technologies. Therefore, the government needs to promote the level of TF by promoting technological progress.

According to the Tobit regression of the Malmquist index of medical and health expenditure in 31 provinces of China in recent years, we can see that the improvement of education level contributes to the improvement of total factor productivity of medical and health expenditure, that is, higher education level contributes to the promotion of local residents'ability to identify and supervise the level of medical services, and then makes local government officials more efficient in providing public services. Common products. The improvement of education level is helpful to the improvement of administrative personnel's management level. This proves the positive externality of education level to local development. In addition, improving the scope of local financial authority management can help to improve the efficiency of medical expenditure. This result may be due to the local government's deeper understanding of the level of local medical services. Improving local government's financial autonomy can effectively motivate local governments to provide more efficient public services. Therefore, under the background of fiscal and taxation system reform, the further division of power and financial power between central and local governments is of great significance to improve the quality and efficiency of local medical and health expenditure.

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