

# Study on Financial Decentralization and Performance of Regional Public Health Services

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## Abstract

Based on the process of public health service input and output benefit, this paper explores the impact of china's financial decentralization on the performance of regional public health services from an empirical perspective by constructing the regional public health service expenditure evaluation index, output performance evaluation index, service performance evaluation index and comprehensive performance evaluation index, combined with the panel data of 31 provinces in China from 2010 to 2017. The research shows that: From the empirical point of view, we explore the impact of fiscal decentralization on the performance of regional public health services, and the research shows that in recent years, the overall performance of public health services in China has grown relatively slowly, the performance of regional public health services in China shows regional differences, and the gap between regional public health service performance in different regions has shown a narrowing trend in recent years. On the basis of constructing the evaluation system of regional public health service performance, this paper empirically explores the effect between fiscal decentralization and regional public health service performance from the perspective of income and expenditure of fiscal decentralization. Regression results surface: from different financial decentralization point of view, found that the impact on the performance of regional public health services results are different. From the perspective of income of fiscal decentralization, it is found that financial decentralization can promote the input performance and output performance of regional public health services in China, but there is no significant correlation between the beneficial performance and comprehensive performance of regional public health services. From the perspective of expenditure of fiscal decentralization, it is found that the input performance and comprehensive performance coefficient of financial decentralization are significantly negative lysed about the input performance and comprehensive performance coefficient of public health services in China, but there is no significant correlation between the output performance and benefit performance of regional public health services.

## Keywords

Financial decentralization, Regional public health services, performance evaluation.

## 1. RESEARCH BACKGROUND AND LITERATURE REVIEW

With the continuous development of Our country's economy, government work is gradually shifting to focusing on people's livelihood, and basic public health services are the top priority of people's livelihood work. On the other hand, with the improvement of residents' living standards, people's pursuit of quality of life is getting higher and higher, and more and more attention is paid to their own health. Over the past two decades, our government's health spending has grown year by year, from RMB 52.35 billion in 1997 to RMB152,587 million in

2017, accounting for 5.67% of fiscal expenditure from 5.67% in 1997 to 2017 7.14% year. This explores whether the government work can solve the problem of "expensive and difficult to see a doctor" in the life of residents, and it is very important to explore the impact of the performance of basic public health services under the system of financial separation of powers in china.

Financial decentralization is an important fiscal and taxation system in China, and most of the existing literature explores the expenditure efficiency and supply performance of regional public health services from the perspective of fiscal decentralization in our country. From the financial decentralization to China's basic public health service expenditure performance: such as Liu Wenyu based on provincial panel data analysis found that the financial separation of powers significantly affect the efficiency of basic public health expenditure in various provinces of China, the overall health expenditure efficiency of our government decreased year by year and the efficiency is not high. Wang Xiaoqin explores the basic public health expenditure efficiency of local governments in China through DEA measurement, combining the Tobit panel data model and using the fixed effect estimation parameter model to find that fiscal decentralization encourages the government to compete for the growth of the local economy, thus neglecting the expenditure performance of basic public health services. Ning Xiaohua through empirical research found that the expenditure performance of fiscal decentralization on basic public health services is different due to the different indicators of fiscal separation of powers, and the expenditure performance of basic public health services can be improved by the government with greater fiscal revenue autonomy. From the financial decentralization of China's basic public health service supply performance: the bank through three combination indicator sprediction method and Shannon-Spearman method to build a new financial separation index measurement method, financial separation of powers in different regions when the impact of China's basic public health services supply performance is different, financial decentralization in the first and second regions, Financial decentralization is positively correlated with the supply performance of basic public health services, while financial decentralization enters the third region, and the two are negatively correlated. However, the author believes that the whole process of improving the input of regional public health services, thus promoting the material output of regional public health services, and ultimately really improving the health level of the residents of the region is the real purpose, so the author thinks that the impact of fiscal decentralization on regional public health services is not comprehensive only from the point of view of input and output. This paper attempts to construct the regional public health service performance evaluation system from the perspective of the whole process of regional public health service input, regional public health service output and regional public health service benefiting regional residents, and explores the impact of financial decentralization on the performance of regional public health service in China.

## **2. CONSTRUCTION AND DESCRIPTIVE ANALYSIS OF THE PERFORMANCE EVALUATION INDEX SYSTEM OF LOCAL PUBLIC HEALTH SERVICES**

### **2.1. The Construction of the Evaluation Index System for the Performance of Local Public Health Services**

At present, there is no uniform standard for the evaluation index system of local basic public health service performance in our country, and most scholars evaluate performance from the input or output of local basic public health service. However, the author believes that through the financial decentralization by affecting local public health services input, such as local government health expenditure, and thus affect the output of each other's public health services, especially the material output, such as the number of primary health institutions per capita, the

number of beds per 10,000 population health care institutions, the number of health technicians per thousand population, etc., and finally really benefit people, improve people's health level, such as reducing population mortality, maternal mortality, improve maternal system management rate, prenatal check-up rate, etc. Therefore, the author thinks that we should explore the evaluation of the performance of local basic public health service in China by the financial separation from all angles. It is precisely because the logical system of financial decentralization will influence the performance of public health services from the input, output and benefit of basic public health services, it is more reasonable and perfect to construct a comprehensive evaluation index system. This paper evaluates the performance of local basic public health services from input, output to benefit, and the following table:

**Table 1.** Regional Public Health Service Performance Evaluation System

Level I indicator	Secondary indicators	Level 3 indicators
Comprehensive performance of regional public health services	Input performance	Government health expenditure as a percentage of GDP, government health expenditure as a percentage of fiscal expenditure, per capita government health expenditure
	Output performance	Number of primary health institutions per capita, number of institutions per capita for disease control centers, number of maternal and child health care institutions per capita, number of beds per 10,000 population medical and health institutions, number of health and technical personnel per thousand population
	Benefit performance	Population mortality rate, card-building rate (%)(%), maternal system management rate, prenatal check-up rate, post-natal rate, hospital delivery rate, maternal mortality rate, neonatal visit rate, under-3 child system management rate, under-7 child health management rate, low-weight prevalence rate of children under5 years of age (%), perinatal mortality rate, proportion of babies born at birth weight less than 2500g, Category A and B statutory reporting incidence of infectious diseases, A-B statutory report ingress of infectious disease mortality

## 2.2. Synthesis of Evaluation Indicator System

Because of the difference between the volume and magnitude of the specific local basic public health service indicators, the specific evaluation indicators cannot be simply added directly, and the standardized treatment of data evaluation indicators should be carried out first. There are two common methods of standardized data processing, standardization methods and formalization methods. This paper adopts a formalization method, also known as deviation standardization, which is to transform the raw data linearly so that its results are mapped to a interval of .0,1. This is done by calculating the difference between the original data and its very small values and the difference between the maximum and the minimum, and by calculating the ratio between them to produce standardized data for the three-level indicator. Due to the negative correlation between population mortality, maternal mortality, low-weight prevalence of children under5 years of age (%)(%), perinatal mortality rate, infant weight less than 2500g

at birth, incidence of statutory reported infectious diseases in Category A and B, and indicators of achievement of statutory reporting of infectious disease deaths in Category A and B, the difference between extreme values and their raw data was used in the treatment. The aim is to ensure a positive correlation between the performance of specific indicators and local basic public health services. After calculating the three-level indicators, through the simple weighted average between the three-level indicators of each group, the two-level indicators are synthesized upward, and the secondary indicators are then combined with a simple weighted average, and the first-level indicators, that is, the performance evaluation indicators of regional public health services, are synthesized.

The data of regional public health service indicators in this paper is derived from the China Statistical Yearbook and the China Health Statistics Yearbook, and some of the missing data are obtained by finding the local yearbook and the official website of the China Bureau of Statistics.

### 2.3. Descriptive Analysis of Regional Public Health Service Performance

**Table 2.** Ranking of comprehensive performance of regional public health services in 31 provinces (autonomous regions and municipalities) in China 2010-2017

Area	Comprehensive performance	Ranking	Area	Comprehensive performance	Ranking
Beijing	56.99%	1	Shandong	43.02%	17
Qinghai	50.95%	2	Shanghai	42.74%	18
Shaanxi	50.33%	3	Guangxi	42.25%	19
Tibet	49.50%	4	Jiangxi	42.22%	20
Gansu	48.98%	5	Hunan	41.42%	21
Ningxia	48.20%	6	Heilongjiang	41.41%	22
Sichuan	46.76%	7	Fujian	41.17%	23
Guizhou	46.26%	8	Chongqing	40.89%	24
Inner Mongolia	45.44%	9	Henan	40.75%	25
Zhejiang	44.99%	10	Jiangsu	40.63%	26
Hubei	44.59%	11	Liaoning	40.53%	27
Yunnan	44.13%	12	Hainan	39.09%	28
Shanxi	44.07%	13	Tianjin	37.35%	29
Jilin	43.85%	14	Guangdong	37.35%	30
Xinjiang	43.70%	15	Anhui	36.89%	31
Hebei	43.41%	16	National average	43.87%	/

Based on the regional public health service performance indicators constructed in this paper, we calculate the overall performance ranking of regional public health services in 31 provinces (autonomous regions and municipalities) in China for 2010-2017. Reference is made to the division methods of the east, the middle and the west by Reference to Yan Gang and Wang Xiaolu. As can be seen from Figure 2, the overall performance of regional public health services from 2010 to 2017 shows regional distribution differences. The top 10 provinces, with the exception of Beijing and Zhejiang, are from the western region. Five provinces (autonomous regions and municipalities) ranked in the middle of the overall performance of regional public health services are from the central region. Six of the six provinces (autonomous regions and municipalities) ranked in the bottom 10 in the overall performance of regional public health services are from the eastern regions. From this we can find that the comprehensive performance of regional public health services in China shows the phenomenon of low in the

eastern region and high in the western region. The possible reason is that although the eastern region is economically developed, its population is larger. In contrast, although the western region is economically underdeveloped, its population is relatively small and the per capita health resources situation may be more advantageous. The average comprehensive performance of public health services in 13 provinces (autonomous regions and municipalities directly under the central government) is higher than the national average, while the performance of public health services in the eastern region is lower than the national average. We know that the eastern region, as China's economically developed region, has gathered the majority of the population, but the level of input, output and income of medical resources is relatively tight, to solve and improve the level of public health services in the eastern region is related to the key to China's people's livelihood.

**Table 3.** Ranking of the overall performance changes in regional public health services in 31 provinces (autonomous regions and municipalities) in China 2010-2017

Area	Magnitude of change	Ranking	Area	Magnitude of change	Ranking
Qinghai	15.37%	1	Jiangxi	2.15%	17
Sichuan	10.77%	2	Liaoning	1.68%	18
Chongqing	8.30%	3	Shandong	1.03%	19
Hainan	8.25%	4	Fujian	0.42%	20
Anhui	7.80%	5	Shanxi	0.28%	21
Hunan	7.13%	6	Zhejiang	0.19%	22
Jiangsu	6.42%	7	Jilin	-0.26%	23
Guizhou	5.39%	8	Tibet	-0.31%	24
Gansu	5.11%	9	Shanghai	-1.50%	25
Inner Mongolia	4.29%	10	Guangxi	-1.71%	26
Guangdong	3.97%	11	Heilongjiang	-2.34%	27
Hubei	3.95%	12	Hebei	-4.95%	28
Yunnan	3.11%	13	Tianjin	-5.56%	29
Henan	2.63%	14	Xinjiang	-5.67%	30
Ningxia	2.55%	15	Beijing	-10.79%	31
Shaanxi	2.30%	16	National average	2.26%	/

Table 3 is the ranking of the overall performance changes in regional public health services in 31 provinces (autonomous regions and municipalities) in China for 2010-2017. As can be seen from the figure, the overall performance of public health services in 22 provinces (autonomous regions and municipalities directly under the Central Government) in China is showing an improvement trend. Growth was concentrated in the western and central regions, with Qinghai, Sichuan and Chongqing with the top three growth rates of 15.37%, 10.77% and 8.30%, respectively. The three largest declines were in Beijing, Xinjiang and Tianjin, with the largest declines of 10.79%, 5.67% and 5.56%, respectively. Among them, the top ten provinces (autonomous regions, municipalities directly under the central government) in the overall performance of the change range ranking in addition to Heilongjiang and Tianjin is still lower, the other provinces (autonomous regions, municipalities directly under the Central Government) of the overall performance of the change range ranking is high, indicating that the gap between China's regional public health services is improving.

**Table 4.** Ranking of input performance, output performance, and benefit performance of public health services in 31 provinces (autonomous regions and municipalities) in China 2010-2017

Area	Input performance	Ranking	Area	Output performance	Ranking	Area	Benefit performance	Ranking
Tibet	67.60%	1	Tibet	61.58%	1	Jiangsu	89.48%	1
Qinghai	52.02%	2	Xinjiang	44.20%	2	Beijing	87.97%	2
Beijing	48.26%	3	Qinghai	38.65%	3	Zhejiang	87.39%	3
Guizhou	47.77%	4	Beijing	34.75%	4	Ningxia	86.45%	4
Guangxi	47.17%	5	Liaoning	32.72%	5	Shaanxi	85.47%	5
Yunnan	44.83%	6	Inner mongolia	32.19%	6	Shanghai	84.48%	6
Gansu	44.07%	7	Shaanxi	31.77%	7	Inner mongolia	81.56%	7
Hainan	39.35%	8	Shanxi	30.64%	8	Shandong	81.53%	8
Henan	38.59%	9	Sichuan	29.45%	9	Liaoning	81.14%	9
Jiangxi	37.78%	10	Heilongjiang	26.90%	10	Tianjin	80.21%	10
Anhui	37.49%	11	Gansu	25.38%	11	Jilin	79.99%	11
Sichuan	36.65%	12	Hunan	25.26%	12	Guangdong	79.92%	12
Hebei	34.17%	13	Ningxia	24.96%	13	Heilongjiang	79.87%	13
Shaanxi	33.75%	14	Jilin	24.74%	14	Hubei	79.58%	14
Ningxia	33.19%	15	Shandong	24.61%	15	Fujian	78.29%	15
Hubei	30.83%	16	Hubei	23.35%	16	Gansu	77.50%	16
Fujian	29.13%	17	Guizhou	22.07%	17	Hebei	74.48%	17
Shanxi	27.86%	18	Hebei	21.57%	18	Sichuan	74.19%	18
Chongqing	27.25%	19	Chongqing	21.45%	19	Jiangxi	74.10%	19
Hunan	27.16%	20	Shanghai	20.99%	20	Chongqing	73.99%	20
Xinjiang	27.08%	21	Zhejiang	20.53%	21	Shanxi	73.72%	21
Zhejiang	27.06%	22	Henan	19.81%	22	Hunan	71.84%	22
Jilin	26.83%	23	Yunnan	17.41%	23	Yunnan	70.14%	23
Guangdong	23.20%	24	Jiangsu	17.13%	24	Guizhou	68.94%	24
Shandong	22.92%	25	Fujian	16.09%	25	Anhui	64.46%	25
Shanghai	22.75%	26	Guangxi	15.63%	26	Guangxi	63.96%	26
Inner mongolia	22.58%	27	Jiangxi	14.77%	27	Hainan	63.88%	27
Tianjin	19.51%	28	Hainan	14.04%	28	Henan	63.84%	28
Heilongjiang	17.45%	29	Tianjin	12.34%	29	Qinghai	62.20%	29
Jiangsu	15.26%	30	Guangdong	8.93%	30	Xinjiang	59.81%	30
Liaoning	7.74%	31	Anhui	8.72%	31	Tibet	19.32%	31
Average	32.82%	/	Average	24.60%	/	Average	74.18%	/

Table 4 is the ranking of input performance, output performance, and benefit performance of public health services in 31 provinces (autonomous regions and municipalities) in China for 2010-2017. As can be seen from the table, there are significant differences in the performance of investment in regional public health services, with the first-ranked Tibet's input performance at 67.60%, while the top-ranked Liaoning is only 7.74%. There are obvious regional differences in input performance, with 6 of the top 10 provinces (autonomous regions

**Table 4.** Ranking of the changes in input performance of public health services in 31 provinces (autonomous regions and municipalities) in China 2010-2017, the magnitude of changes in output performance, and the range of changes in benefit performance

Area	input performance	Ranking	Area	output performance	Ranking	Area	benefit performance	Ranking
Qinghai	8.70%	1	Guizhou	19.19%	1	Anhui	14.69%	1
Guangdong	7.97%	2	Qinghai	17.30%	2	Tibet	8.03%	2
Liaoning	4.66%	3	Chongqing	14.16%	3	Shanghai	7.37%	3
Hainan	3.52%	4	Sichuan	13.20%	4	Hunan	5.95%	4
Jiangxi	3.33%	5	Hubei	12.66%	5	Gansu	5.45%	5
Inner mongolia	2.92%	6	Shaanxi	11.18%	6	Hainan	5.07%	6
Shandong	2.65%	7	Hunan	10.66%	7	Qinghai	3.82%	7
Hubei	1.97%	8	Jiangsu	8.82%	8	Tianjin	3.43%	8
Chongqing	1.94%	9	Zhejiang	7.49%	9	Yunnan	2.75%	9
Yunnan	1.77%	10	Yunnan	7.45%	10	Sichuan	2.19%	10
Sichuan	1.76%	11	Ningxia	6.17%	11	Jilin	1.35%	11
Fujian	1.53%	12	Henan	5.87%	12	Ningxia	1.14%	12
Jiangsu	1.47%	13	Inner mongolia	5.58%	13	Zhejiang	0.55%	13
Guangxi	0.64%	14	Jiangxi	4.35%	14	Jiangsu	-0.80%	14
Shanxi	0.63%	15	Liaoning	4.15%	15	Inner mongolia	-1.02%	15
Anhui	0.45%	16	Shandong	4.06%	16	Beijing	-1.46%	16
Henan	-0.10%	17	Heilongjiang	3.23%	17	Jiangxi	-1.93%	17
Tibet	-0.15%	18	Guangxi	2.47%	18	Heilongjiang	-2.35%	18
Ningxia	-0.64%	19	Gansu	2.00%	19	Shanxi	-2.48%	19
Gansu	-0.73%	20	Hainan	0.46%	20	Shaanxi	-2.79%	20
Hunan	-0.89%	21	Tibet	0.21%	21	Henan	-2.83%	21
Guizhou	-1.27%	22	Anhui	-0.09%	22	Xinjiang	-3.41%	22
Shaanxi	-1.76%	23	Xinjiang	-0.11%	23	Hebei	-3.42%	23
Jilin	-3.88%	24	Fujian	-1.40%	24	Guizhou	-3.99%	24
Hebei	-4.54%	25	Jilin	-1.70%	25	Fujian	-4.20%	25
Shanghai	-5.01%	26	Hebei	-1.78%	26	Chongqing	-4.67%	26
Heilongjiang	-5.83%	27	Guangdong	-1.80%	27	Hubei	-6.11%	27
Zhejiang	-6.21%	28	Beijing	-6.95%	28	Liaoning	-6.75%	28
Xinjiang	-11.64%	29	Shanxi	-8.41%	29	Guangdong	-7.85%	29
Tianjin	-11.99%	30	Shanghai	-8.75%	30	Guangxi	-12.47%	30
Beijing	-19.72%	31	Tianjin	-11.98%	31	Shandong	-14.19%	31
Average	-0.92%	/	Average	3.80%	/	Average	-0.67%	/

and municipalities directly under the central government) coming from the western region, while the central region's input performance ranking is more concentrated in the middle level, while 7 of the top 10 provinces (autonomous regions and municipalities directly under the central government) are from the eastern region. The output performance difference struck by regional public health services was also significant. The top-ranked Tibet output performance was 61.58%, while the top-ranked Anhui output performance was 8.72%. Output performance also shows significant regional differences. The distribution is similar to the input performance,

with 6 of the top 10 provinces (autonomous regions and municipalities directly under the central government) coming from the western region, while the output performance ranking in the central region is still more concentrated in the middle level, while 5 of the top 10 provinces (autonomous regions and municipalities directly under the central government) are from the eastern region. Both input performance and output performance show the phenomenon of the western region ranked high and the eastern region ranked lower, which may be due to the small population size in the western region, the corresponding government health expenditure and the corresponding output of medical and health resources have obvious effect. The benefit performance except for Tibet 19.32% ranked first, the other regions' earnings performance gap is relative to input, output performance difference is small. Benefit performance also shows significant regional differences. Seven of the top 10 provinces (autonomous regions and municipalities directly under the central government) are from the eastern region, while the central region's level of benefit performance is still more concentrated in the middle level, and 6 of the provinces (autonomous regions and municipalities directly under the central government) in the bottom 10 of the beneficiary performance rankings are from the western region. Obviously, the level of benefit performance in the eastern region is higher than that in the western region, the reason may be that the economic level of the eastern region is more developed, and the corresponding medical resources conditions and level are higher than that in the western region.

Table 4 shows that 5 of the provinces (autonomous regions, municipalities directly under the central government) ranked in the bottom ten in terms of investment performance of regional public health services are ranked highest. Explain that some provinces (autonomous regions, municipalities directly under the central government) and especially some eastern regions are improving the investment in regional public health services. Of the provinces (autonomous regions and municipalities directly under the central government) in the bottom ten, five provinces (autonomous regions and municipalities directly under the central government) still have a relatively low rate of change in the performance of regional public health services. The output performance of the bottom ten provinces (autonomous regions and municipalities directly under the central government) ranked high among the top 10 provinces (autonomous regions and municipalities directly under the central government). It shows that most provinces (autonomous regions and municipalities directly under the central government) especially in the central and western regions are working to improve the health and health output. Overall, the decline in the performance of public health services output in most provinces in the eastern region is still relatively low, indicating that the supply of medical resources such as health facilities and health personnel in the eastern part of the country remains tight. Seven of the provinces (autonomous regions and municipalities directly under the central government) ranked in the bottom ten in terms of beneficiary performance for public health services in the region ranked highest in terms of the rate of change in the performance of beneficiaries, especially in the central and western regions. It shows that the benefit performance of the central and western regions of China is gradually improving, the gap between the benefits of medical services between regions in China is narrowing, and the gap between inter-regional health services is improving in the direction of equalization. It is worth noting that the rate of change in the performance of public health services in most provinces remains negative, indicating that the pressure on public health services in the regions of our country that benefit people's well-being remains a significant task.

### 3. EMPIRICAL ANALYSIS OF THE IMPACT FACTORS OF PROVINCIAL GOVERNMENT'S PUBLIC SERVICE PERFORMANCE

#### 3.1. Model Settings

Public health service is an important part of benefiting people's livelihood, the government in the field of public health services bear greater social responsibility, based on the existing government property rights and division of financial system at all levels of government, so this paper will establish the following model from the perspective of financial separation of powers, to explore the impact of China's financial decentralization on the performance of regional public health services:

$$\text{PERFORMANCE}_{it} = \alpha + \beta \text{FD}_{it} + \gamma \text{CONTROLS}_{it} + \varepsilon_{it} \quad (1)$$

I for province (autonomous region, municipality directly under the central government), t for year, PERFORMANCE for the interpretation of variables of the performance of public health services, including regional public health service input performance, regional public health service output performance, regional public health service benefit performance and comprehensive performance of regional public health services. The performance evaluation system of regional public health service is synthesized by the previous text. CONTROLS represents a set of control variables, including urbanization rate, GDP per capita, total dependency ratio, population size, illiteracy rate, industrial structure, and openness to the outside world.

#### 3.2. Variable Description

FD stands for financial separation of powers and is the core explanatory variable in this article. The fiscal separation of powers represents the degree of freedom of fiscal expenditure owned by local governments, and the greater the autonomy of local governments in fiscal separation. The more likely it is to regulate local public health services, which will have an impact on the performance of the other party's public health services. At present, different scholars take different measures of financial separation of powers. At present, the mainstream method uses four measures: non-tax autonomy standard, fiscal autonomy standard, income standard, expenditure standard. The non-tax autonomy standard is measured from the perspective of the right of local government stake in the non-tax revenue obtained, such as charges for special administrative undertakings, penalty income, special income, etc. The financial autonomy standard is from the point of view of local governments using their own income to obtain financing capacity. The income and expenditure standard mainly measures the fiscal freedom of local governments by the proportion of local per capita fiscal revenue and expenditure to the central per capita fiscal income and expenditure. Fiscal decentralization refers to the size of the central government's decentralization of fiscal control to local governments, which is reflected in the size of the fiscal revenue and fiscal expenditure rights owned by local governments. In order to explore the impact of fiscal decentralization on the performance of local government public health services in a more comprehensive way, this paper will explore the impact of fiscal decentralization on the performance of local public health services from the perspective of income standard and expenditure standard, and the specific income standard's financial separation is measured by the formula for the budget per capita financial income / and central per capita fiscal income, and the financial separation of power measurement formula for the budget per capita level financial expenditure. / Central per capita fiscal expenditure.

Urbanization rate, generally speaking, the higher the rate of urbanization in a given area, the higher the corresponding level of local economic development, the higher the level of education of the population, more and better public health services are more likely to be improved.

"Gdppercapita, higher per capita GDP, the more developed the economy is, and the more able it is to invest more in health care, provide better medical facilities and services, but a developed GDP may be caused by local governments focusing on economic development and neglecting basic public services."

The higher the total dependency ratio, the higher the non-working-age population, i.e. the 14 years and below and the higher the proportion of the working-age population, and the higher the proportion of the non-working-age population is a group prone to health problems, the higher the total dependency ratio, the higher the pressure on public health services in the region.

Population size, the smaller the size of the region, that per capita public health services expenditure, per capita level of medical facilities is relatively high, but the population size is less than the region, relatively less developed areas, the level of medical care may also be relatively backward.

Illiteracy rate, generally speaking, the higher the illiteracy rate in a region, relatively speaking, the region's population's education level is relatively backward, so the health level of attention is not very much attention to the government's supervision of public health services will also be reduced, while the high illiteracy rate of the region may also be relatively backward, the more ineligible to provide quality medical resources.

Industrial structure, that is, non-agricultural industry output value as a proportion of GDP, the higher the industrial structure of the region's non-agricultural development level, relatively speaking, the local economy into the secondary and tertiary level of high, the higher the level of economic development, the more advantages to provide more adequate public health services.

Opening up to the outside world, the total import and export trade as a proportion of GDP, opening up is a measure of a region's foreign economic and trade situation, generally speaking, the better the economic level of the region, the higher the degree of opening up, the corresponding investment in public health services will increase.

The above data are based on panel data from 31 provinces (autonomous regions and municipalities directly under the Central Government) in China from 2010to2017, all of which are from the China Statistical Yearbook over the years, and the relevant variables and descriptive statistics are shown in Table 5below:

**Table 5.** Variable Definition and Descriptive Statistics

Variable	View Measuring Value	Flat Are Value	Standard Quasi - Poor	Most Small Value	Most Big Value
Input performance	248	0.328	0.132	0.025	0.766
Output performance	248	0.246	0.112	0.073	0.631
Benefit performance	248	0.742	0.134	0.141	0.908
Comprehensive performance	248	0.439	0.05	0.302	0.625
Financial decentralization of income calibre	248	0.585	0.433	0.197	2.293
Urbanization rate	248	0.55	0.136	0.227	0.896
ln GDP per capita	248	1.463	0.451	0.28	2.558
Total dependency ratio	248	0.356	0.065	0.19	0.51
ln Population Size	248	8.116	0.844	5.704	9.321
Illiteracy rate	248	0.06	0.061	0.012	0.412
Industrial structure	248	0.899	0.051	0.739	0.996
Openness	248	0.283	0.317	0.012	1.58

### 3.3. Empirical Results and Analysis

Hausman test should use a fixed effect model, so through the stata regression to obtain table 6 revenue-caliber financial separation caliber of regional public health service performance regression results and Table 7 support the fiscal decentralization caliber of regional public health service performance regression results.

**Table 6.** Results of Regression of Revenue-caliber Fiscal Decentralization to Regional Public Health Service Performance

Explaining variables	Input performance	Output performance	Benefit performance	Comprehensive Performance
Financial decentralization of income calibre	0.114** (2.00)	0.043* (1.89)	0.013 (0.3)	0.005 (0.19)
Urbanization rate	0.781** (2.58)	0.859*** (4.95)	-1.173*** (-5.69)	0.156 (1.14)
ln GDP per capita	0.048 (1.03)	0.038 (1.42)	0.153*** (4.78)	0.08*** (3.75)
Total dependency ratio	-0.482** (-2.46)	-0.009 (-0.08)	-0.36*** (-2.7)	-0.284*** (-3.2)
ln Population Size	-0.192 (-0.86)	-0.665*** (-5.21)	-0.215 (-1.42)	-0.357*** (-3.55)
Illiteracy rate	-0.069 (-0.26)	-0.202 (-1.31)	-0.287 (-1.57)	-0.186 (-1.53)
Industrial structure	-0.375 (-0.91)	-0.313 (-1.33)	0.852*** (3.05)	0.055 (0.3)
Openness	-0.026 (-0.47)	0.051 (1.63)	0.055 (1.47)	0.027 (1.08)
Constant items	1.911 (1.09)	5.393*** (5.34)	2.261* (1.89)	3.188*** (4)
R2	0.223	0.446	0.231	0.328
Observations	248	248	248	248

Note:(1) the symbol is significant at the 1% level, the value in the (2) bracket represents the value of the regression coefficient at the level of 5%, the symbol , the symbol , represents the value at the level of 1% The t-value.

The impact of financial decentralization from income-based financial division on input performance, output performance, benefit performance and comprehensive performance of regional public health services is positively correlated. The performance of investment in regional public health services was positive at a 5% significant level. For every additional unit of revenue-caliber fiscal decentralization, the investment performance of regional public health services increases by 0.114 units. There is a significant positive correlation between the financial separation of income calibre and the input of regional public health services. The possible reason is that from the point of view of the fiscal separation of income, the greater the fiscal separation of powers of local governments, the more the local government has the financial power to assume the responsibility for local public health services, the more adequate financial expenditure for local public health services. The financial decentralization of income calibre is positively correlated with the output performance of regional public health services at a significant 10% level. Similarly, it can be speculated that because local governments have greater fiscal power, local governments spend more on regional public health services, thereby increasing local health resources and making the material conditions of regional health services more secure. However, the beneficial performance and comprehensive performance of the financial decentralization of income calibre to local public health services, although the

regression coefficient is positive, but they have not passed the significance test. Perhaps because the financial decentralization in the process of transforming into a real benefit to local residents is affected by many factors, and the regional public health service benefit performance and comprehensive performance is an important indicator to measure the well-being of the people of the region, China's current financial system in improving the performance of regional public health services still bear a great responsibility.

**Table 7.** Results of regression of fiscal decentralization to regional public health services

Explaining variables	Regional Public Health Service Input Performance	Regional public health service output performance	Regional Public Health Services Benefit Performance	Comprehensive performance of regional public health services
Fiscal decentralization of expenditure calibre	-0.207*** (-4.3)	-0.009 (-0.33)	-0.012 (-0.41)	-0.07*** (-3.15)
Urbanization rate	0.388 (1.36)	0.827*** (4.85)	-1.323*** (-7.54)	0.011 (0.08)
ln GDP per capita	0.104** (2.41)	0.043* (1.67)	0.142*** (5.36)	0.101*** (5.06)
Total dependency ratio	-0.618*** (-3.27)	-0.018 (-0.16)	-0.367*** (-3.15)	-0.332*** (-3.8)
ln Population Size	-0.192 (-0.9)	-0.666*** (-5.22)	-0.07 (-0.53)	-0.358*** (-3.63)
Illiteracy rate	0.331 (1.22)	-0.181 (-1.11)	-0.181 (-1.08)	-0.048( -0.38)
Industrial structure	-0.016 (-0.04)	-0.288 (-1.21)	0.93*** (3.81)	0.184 (1)
Openness	-0.046 (-0.88)	0.049 (1.58)	0.005 (0.16)	0.019 (0.79)
Constant items	1.969 (1.17)	5.401*** (5.35)	0.97 (0.93)	3.213*** (4.13)
R2	0.287	0.446	0.314	0.358
Observations	248	248	248	248

Note:(1) the symbol is significant at the 1% level, the value in the(2)bracket represents the value of the regression coefficient at the level of 5%, the symbol , the symbol , represents the value at the level of 1% The t-value.

From the results of the regression of control variables, it can be seen that the urbanization rate has a significant positive correlation between the input performance and output performance of regional public health services, which may be due to the increasing level of local economy with high urbanization rate, the more financial resources can be enough to guarantee the input and output performance of local public health services. However, the beneficial performance of regional public health services is significantly negative correlation, possibly due to the relatively large urbanization rate of the local population, so that the per capita medical services are relatively tight. The benefit performance and comprehensive performance of GDP per capita to regional public health services are positively correlated at the 1% significance level, possibly because the higher the income level of the regional residents, the more economic strength they have to ensure their own health level. The input performance, output performance, benefit performance and comprehensive performance of regional public health services were negatively correlated. In addition to output performance, the other three

performance indicators passed the significance test, indicating that the greater the proportion of the non-labour population in the region, the greater the pressure of public health services in the region. The population size is significantly negatively correlated with the output performance and comprehensive performance of regional public health services, indicating that the larger the population size of the region, the more strained the per capita medical resources and health services of local public health services. The illiteracy rate on regional public health services of the four indicators of achievement are burdened and did not pass the significance test, perhaps because China with the universal illiteracy rate of compulsory education is getting lower and lower, its impact is becoming less and less. The beneficial performance of industrial structure to public health services is significantly positively correlated, which shows that the development of industrial structure can improve the benefit of local residents' public health services, and the impact of opening up to the public health services in the region is not significant.

The impact of financial decentralization from expenditure caliber on input performance, output performance, benefit performance and comprehensive performance of regional public health services is negatively correlated. This is in contrast to the regression results of the four indicators of fiscal decentralization from income to the performance of regional public health services. Among them, the financial decentralization of expenditure calibre is significantly negatively correlated with the input performance of regional public health services, and for each additional unit of fiscal decentralization of expenditure calibre, the expenditure performance of regional public health services decreases by 0.207 units. This is consistent with what most scholars have already studied. That is, under the background of the local government's existing performance appraisal as the performance of official promotion, the local government often invests the financial funds in the productive expenditure with obvious effect of economic growth. As non-productive expenditure, the regional public health service expenditure is often lagging behind in promoting economic growth. As a result, local governments are losing sight of investment in regional public health services. Although the output performance and benefit performance of the financial decentralization of expenditure calibre to the regional public health services were negative, they did not pass the significance test. However, the financial decentralization of expenditure calibre is negatively correlated with the overall performance of regional public health services at the significant level of 1%, which shows that the current fiscal separation system of our country does not significantly provide the public health service performance of local residents, and the local government has a greater degree of fiscal expenditure right while not better shouldering the right to improve the public health service of the regional residents.

From the regression model of expenditure caliber financial decentralization to regional public health service performance, the regression of control variables is about the same as the regression of control variables from the income-caliber financial separation to the regional public health service performance model.

## **4. RESEARCH CONCLUSIONS AND POLICY RECOMMENDATIONS**

### **4.1. Findings**

This paper constructs the performance evaluation system of regional public health service based on the whole process angle of regional public health service input, regional public health service output and regional public health service benefiting regional residents. From the descriptive statistics: 1 In recent years, China's regional public health services, the overall performance growth is relatively slow. 2 The performance of public health services in China shows regional differences, with the overall performance of public health services in the western region ranking high, while the performance of public health services in the eastern

region is ranked lower. 3 There are also differences between input performance, output performance and beneficiary performance of local public health service performance. Most western regions rank edgtos in input performance and output performance, but benefit performance is lower. The central region ranks in the middle of input performance, output performance and benefit performance. The input performance and output performance in the eastern region are ranked lower, while the benefit performance is ranked higher. 4 Disparities in the performance of public health services in different regions have narrowed in recent years. In constructing the evaluation system of regional public health service performance, this paper empirically explores the effect between fiscal decentralization and regional public health service performance from the perspective of income and expenditure of fiscal decentralization. Regression Results Surface:1 Different financial decentralization perspectives found different impacts on the performance of regional public health services. 2 From the perspective of income of fiscal decentralization, it is found that financial decentralization can promote the input performance and output performance of regional public health services in China, but there is no significant correlation between the beneficial performance and comprehensive performance of regional public health services. 3 From the perspective of expenditure of fiscal decentralization, it is found that the input performance and comprehensive performance coefficient of financial decentralization are significantly negatively correlated with the input performance and comprehensive performance coefficient of public health services in China, but there is no significant correlation between the output performance and benefit performance of regional public health services.

#### 4.2. Policy Recommendations

Increase the level of investment in basic public health services in the eastern region, actively promote the development of public health services in the central and western regions, and promote the equalization of basic public health services. According to the results of the study, there is a significant difference in the performance of public health service input in China. The top-ranked Tibet has a 67.60% investment performance, while Liaoning, the top-ranked party, is only 7.74%. The input performance shows obvious regional differences, with the western region ranking the investment performance higher, and the investment performance in the eastern region ranking lower. The output performance of public health services in China is also significantly different, with the output performance of Tibet at the top of 61.58 percent, while the output performance of Anhui, which is the last, is 8.72 percent. Output performance also shows obvious regional differences, and the distribution is similar to input performance, but also shows the distribution of the western region in the top and the eastern region after the ranking. Both investment performance and output performance show the phenomenon of the western region ranked first and the eastern region ranked lower. This may be due to the small size of the population in the western region, the corresponding government health expenditure and the corresponding output of health resources have obvious effect. Most of the eastern regions are the more economically developed provinces (autonomous regions and municipalities directly under the central government), which are relatively dense in population, so that the basic public health input level and output level per capita are scarce. Therefore, we should increase the level of investment in basic public health services in the eastern region, and ensure that the per capita basic public health service level and output level increase in volume. The benefit performance except for Tibet 19.32% ranked first, the other regions' earnings performance gap is relative to input, output performance difference is small. The benefit performance also shows obvious regional differences, the eastern region's benefit performance level is higher than that of the western region, the top provinces (autonomous regions and municipalities directly under the central government) are mostly from the eastern region, and the western region's benefit performance is lower. The reason may be that the economic level

of the eastern region is more developed, and the corresponding medical resource conditions and level are higher than that in the western region. Therefore, we should actively develop the level of economic development in the central and western regions, improve the level of medical care for basic public health services in the central and western regions, and ensure that the level of benefits of basic public health services in the central and western regions is improved qualitatively. Two-pronged approach to ensure the development of China's basic public health services, as soon as possible to achieve the goal of equalization.

Speed up the reform of the medical system and improve the level of basic public health services. Basic public health services have the nature of public goods, so the government's intervention in basic public health services is the necessary adjustment to reduce market failure, medical system reform is the government has been focusing on the cause of people's livelihood for a long time. The purpose is to promote the more effective medical and health market, promote the development of China's basic public health services and improve the level of service, solve the residents " difficult to see a doctor, expensive to see a doctor" problem, so that all the residents of the community to enjoy a fair medical service, and effectively improve the health level of all social residents. The reform of the medical system is still a common concern of all the residents of the society, how to maximize the public welfare of the reform of the medical system, so that all the residents of the community can truly enjoy the results of the reform of the medical system. First, solidly promote the construction of the national medical insurance system: focus on solving the problems such as imperfect financing mechanism, imperfect mechanism for the protection of serious diseases, medical services still need to be strengthened, and reform of payment methods to be deepened, so as to further consolidate and improve the health care system for residents. Second, actively promote social medical treatment, focusing on solving the problem of inadequate implementation and support in the areas of access, talent, land, investment and financing, service, capacity and other aspects of social medical treatment. Third, to speed up the reform of public hospitals, focusing on solving the problems of unreasonable planning and layout of public hospitals, weak public welfare, inadequate management system, irregular order of medical treatment and non-matching comprehensive reform. Fourth, consolidate and improve the basic drug system and the new mechanism for the operation of the grass-roots level, focusing on solving the problems of unbalanced implementation of the basic medical reform policy, the lack of timely distribution of some drugs, and the lack of service capacity; Give full play to the role of the market mechanism to establish a new order of drug circulation, and sixthly, to promote the relevant reform work in an integrated manner, in view of the inefficiency of some basic public health service projects, the lag in information construction, the supervision capacity of the medical and health industry is not strong, the assessment and evaluation mechanism is not perfect, and so on, increase the reform efforts in related fields, and strive to enhance the integrity, systematization and coordination of the reform, and form a joint force to promote reform.

Improve the financial separation system and improve the performance appraisal standards of local government officials. In China because of the promotion of local government officials by the higher officials directly appointed and dismissed, for a long time the local government officials' performance assessment standards have been local GDP as an important assessment standard. Local officials are therefore more focused on local economic construction during their tenures, and local governments tend to invest in areas that drive local economic growth in order to achieve greater economic benefits. Non-productive expenditure in basic public services such as basic public health services, compulsory education, culture and sports often does not bring obvious economic benefits immediately. As a result, local governments tend to ignore these areas of unproductive expenditure. Although the scale of government expenditure in basic public service areas such as basic public health services has been increasing in recent years, the performance appraisal of basic public services has been neglected, so it is very meaningful to

improve the performance appraisal standard for local government officials. In addition to assuming the responsibility for the economic development of the region, local governments still bear the important responsibility of improving people's livelihood and enhancing the social welfare of the residents of the district. Therefore, this requires that the performance indicators of local governments should not only include the growth level of the local GDP, but should be considered in a comprehensive way with the performance level of basic public services which are closely related to the people's livelihood work of the residents. Only by taking into account the GDP growth level, basic public health services, education level and other relevant indicators of the term of office of local government officials are included in the performance appraisal standards, can local government officials be forced to pay attention to the performance appraisal of basic public health services closely related to the work of people's livelihood, implement the work of people's livelihood, and improve the health level of all social residents. The empirical study above finds that the relationship between fiscal decentralization and the performance of basic public health services in the region is not the same from different angles of financial separation, and the rational division of local government financial and business power is divided to promote the improvement of the performance level of regional public health services.

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