Comparative Study on Statistical Measurement and Regional Differences of Chinese Public Governance Efficiency

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Abstract: Based on the provincial panel data from 2007 to 2020, this paper uses the translogarithmic stochastic frontier function (SFA) to measure the main influencing factors of China's public governance efficiency and the technical efficiency of public governance output under the same production frontier. Studies show that since the 18th CPC National Congress, the efficiency of China's public governance has been continuously improved; There are significant differences in the technical efficiency of public governance among regions. The technical efficiency of eastern and western regions decreases successively, but the efficiency of central and western regions increases obviously. According to the efficiency and input level, the influence of human input, expenditure structure, government scale, urbanization rate and other factors is more significant. The quadruple decomposition of total factor productivity shows that the technical efficiency and scale efficiency of public governance have a huge space for improvement. Further combining the decision tree algorithm, the urbanization level as one of the nodes to classify our county level government to prove the impact of urbanization on the efficiency of public governance.

1 INTRODUCTION

The Third Plenary Session of the 18th CPC Central Committee put forward the overall goal of deepening the reform in an all-round way, which is to "promote the modernization of the national governance system and governance capacity". Correspondingly, the research in the field of public administration focuses on the field of governance, and the research topic of public administration has gradually shifted from public management to public governance (Wen, 2018). As a super large organization in national governance, the government is relative to or even higher than the market mechanism, which is related to the resource allocation efficiency of the whole society.

At present, the academic circle mainly uses DEA method to measure the efficiency of public governance of our country. Some typical research results include: He Baocheng et al. measured governance efficiency based on the three-stage DEA-BBC model under input guidance, and believed that government governance efficiency has positive spatial spillover effect, which can be transmitted between neighboring regions through "learning effect" and "demonstration effect", thus promoting the improvement of regional overall governance efficiency (He Baocheng et al.,2021). Zhang Jiyuan was specific to the field of public security governance, and made an in-depth analysis of the technical efficiency of public security governance expenditure in Sichuan Province. The results show that factors such as urbanization level and local per capita public financial revenue have a significant impact on the efficiency of public security governance (Guo et al.,2021). Some scholars also use government governance efficiency as an intermediary variable to analyze the impact of institutional reform. For example, Guo Mengnan et al. empirically tested the impact of audit management system reform on the growth of total factor productivity and the intermediary role of government governance efficiency. Studies have found that the reform of audit management system can improve the total factor productivity by improving the government's anti-corruption efforts (Zhang, 2020). Therefore, in order to enhance the scientificity and comprehensiveness of efficiency

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evaluation, it is necessary to reflect on the whole and part based on the concept of "total factor productivity" improvement, and construct an input-output index system of public governance efficiency evaluation with environmental regulation as the link and evaluation dimension as the unit.

However, from the perspective of research methods, the evaluation based on DEA method has certain limitations, that is, the efficiency of DEA evaluation measure is relative and susceptible to the influence of outliers, and all random interference items are also included in the technical inefficiency. This means that other research methods should be comprehensively applied to make up for the deficiency of DEA method in further study on the efficiency of public administration. Different from DEA method, the biggest advantage of SFA method is that the influence of random factors on output is considered by dividing random interference factors into technical inefficiency and random error terms.

2 THEORETICAL MODEL AND DATA

2.1 Stochastic Frontier Model

The technical efficiency measurement method of stochastic frontier model was first proposed by Farrel in 1957, which mainly analyzes the efficiency from two parts: scale efficiency and pure technical efficiency. After the development and improvement of Aigner, Meeusen, Forsund, Schmidt and many other scholars, it has become one of the most commonly used methods to measure technical efficiency at present. The stochastic frontier analysis model is used to estimate the production function. Its basic expression is:

$$Y_{it} = f(x_{it}; t)\exp(v_{it} - u_{it}) \tag{1}$$

In formula (1),Y_{it} represents the actual output of sample i at time t; f () represents the optimal output that can be achieved under the condition of existing technological progress;x_{it} represents the factor input vector of sample i at time t;v_{it} and u_{it} represents the random error term and technical inefficiency index of sample i in the production process at the time of t. Battese and Coell further (BATTESE et al., 1992) proposed a stochastic frontier production function for panel data estimation, and its model form is as follows:

$$Y_{it} = X_{it}\beta + (V_{it} + U_{it}) \tag{2}$$

V_{it} as a random error term, it is the uncontrollable factors in the sample management process, such as emergencies, geographical factors, statistical errors, etc., which may affect the production. Since the direction of the influence cannot be determined, the random error term is set as the bilateral error term, i.e $V_{it} \sim N(0, \sigma_V^2)$.At the same time,$V_{it}$ is independent of $U_{it} = (U_i \exp(-\eta(t-T)))$. η is the parameter to be estimated.u_{it} is the technical inefficiency of sample i in period t. $u_{it} = N^+(m_{it}, \sigma_u^2)$, $m_{it} = Z_{it}\delta$,u_{it} follows a semi-normal distribution and is a non-negative random variable.m_{it} is the technical loss function.Z_{it} is the vector group composed of exogenous variables affecting the efficiency loss of sample i. δ is also a parameter to be estimated. σ_v^2 and σ_u^2 as an argument,the variance of the term conforming to the residual is $\sigma = \sigma_v^2 + \sigma_u^2$ .To define $\gamma = \sigma_u^2 / \sigma_v^2 + \sigma_u^2 (0 \le \gamma \le 1)$. U_{it} is the management error term, which refers to the distance between the sample output and the production possibility boundary. Only when there is no management error in the input and the technical level reaches the optimal condition（$U_{it} = 0$）,the output is going to be on the frontier. At the same time, under the influence of many factors, such as the failure of public governance, the level of government governance and the effectiveness of technology, technology loss is common in the process of public governance. So let's assume U_{it} follows a truncated normal distribution， $U_{it} \sim N(\mu_i, \sigma_\mu^2)$,The mean of administrative error is μ_i， reflect the technical efficiency loss accordingly.

The frontier production function is obtained based on regression, which can calculate the production technical efficiency (TE) and efficiency loss (μ_i) of each sample public governance process.Thus, the factors affecting the efficiency loss of public governance are analyzed, among which:

$$TE_{it} = \frac{E（Y_{it}|\mu_{it}, X_{it}）}{E = （Y_{it}|\mu_{it} = 0，X_{it}）} \tag{3}$$

The numerator to the right of formula (3),$E（Y_{it}|\mu_{it}, X_{it}）$ is the actual total output of the sample, and the denominator is the maximum possible output given the input level.TE_{it} is the ratio of the two, and it ranges from 0 to 1. The closer it is to 0, the higher the technical efficiency loss is. The closer it is to 1, the higher the technical efficiency.

$$\mu_{it} = \sum_{k=1}^{n} \delta_{kt} Z_{kit} + \delta_{it} \quad (4)$$

μ_{it} is the technical loss value of each sample calculated above, reflecting the difference between the input level and the optimal technical level of the sample in the process of public governance; Z_{kit} represents the k-th variable that affects the technical loss value; δ_{kt} is the parameter to be estimated,reflect the influence of variables on technical loss.When the coefficient is negative, it indicates that the variable has a positive influence on the technical efficiency, while the opposite indicates that the variable has a negative influence; δ_{it} represents a random variable subject to an extreme distribution.

In general, due to the flexible form of the translogarithmic production function, the model can reflect the combined influence of different input factors on the output in the production function, and its output elasticity can reflect the differences in the technological progress of different inputs, relax the strict assumption of technological neutrality, and further reveal more characteristics of the system. Therefore, this paper intends to adopt a time-varying efficiency stochastic frontier production model in the form of translog of the following three input factors:

$$\begin{aligned} \ln Y_{it} = {} & \beta_0 + \beta_K(\ln K_{it}) + \beta_L(\ln L_{it}) \\ & + \beta_E(\ln E_{it}) + \beta_t t \quad (5) \\ & + \beta_{KL}(\ln K_{it} \ln L_{it}) \\ & + \beta_{KE}(\ln K_{it} \ln E_{it}) \\ & + \beta_{LE}(\ln L_{it} \ln E_{it}) \\ & + \beta_{KK}(\ln K_{it})^2 \\ & + \beta_{LL}(\ln L_{it})^2 \\ & + \beta_{EE}(\ln E_{it})^2 + \beta_{tt} t^2 \\ & + \beta_{Kt}(\ln K_{it}) t \\ & + \beta_{Lt}(\ln L_{it}) t \\ & + \beta_{Et}(\ln E_{it}) t + v_{it} - u_{it} \end{aligned}$$

In the model, Y is the public governance output of i province in the t year. β_0、β_K、β_L、β_L、β_{Kt} are the parameter vector to be estimated. Use time trend t to reflect technological progress; X is the input factor, and K, L and E are the capital, labor and resource input respectively.

According to theoretical model (4), the influencing factor model of technical loss is also set:

$$\begin{aligned} \mu_{it} = {} & \delta_0 + \delta_1 gov_{it} + \delta_2 cit_{it} \\ & + \delta_3 gdp_{it} + \omega_{it} \end{aligned} \quad (6)$$

μ_{it} is the technical loss in the public governance process of i province in the t year. The influencing factors of public governance technology loss can be divided into internal causes and external causes. The internal causes are mainly related to the basic objective conditions related to public governance, while the external causes are mainly the regional economic development level that affects the output of public governance. In the selection of specific variables, this paper selects three types of influencing factors, using government size (gov) to reflect the natural conditions of public governance output, and urbanization rate (cit) and per capita GDP (gdp) to reflect the technical conditions of public governance output.

2.2 Selection of Data and Variables

2.2.1 Data Selection and Source

Since the 18th CPC National Congress, national governance has become the focus of public management research, and the efficiency of public governance has become an important tool to promote the reform of public governance. The government has gradually strengthened supervision over the exercise of power, increased input in areas related to people's livelihood, assumed more responsibilities for social development, and committed itself to providing better public services. Great achievements have been made in the modernization of the national governance system and capacity, and in comprehensively deepening reform. Therefore, this study selected the public governance input and output data of 31 provinces and autonomous regions except Hong Kong, Macao and Taiwan from 2007 to 2020. Among them, the basic data come from the statistical yearbooks of provinces of China over the years, and the indicators that cannot be directly obtained are shown in Table 1.

2.2.2 Variable Selection and Processing

The selection of input indicators, specifically for public governance, refers to the practice of Qi Yu et al., which correspond to three types of indicators: financial resources, human resources and material resources. Output indicators refer to the research results of some scholars and take governance in related fields as a dimension to measure the output intensity of public governance. According to the research of Beijing Normal University on local government efficiency, the relevant projects of Beijing's fiscal expenditure structure, which ranks first in government efficiency, are screened. Considering the availability of data, indicators in science and technology are selected to show the output of economic development capacity. The output reflecting the provision of public goods was measured by the two indicators of education and health, and the output reflecting the socio-economic welfare and equity of residents was measured by the inverse of social security and employment and the Engel coefficient and Gini coefficient of residents. The indexes of environmental protection, agricultural development and transportation are used to reflect the output of economic activity basis and environment. The output value is obtained by logarithmic sum of the above indexes and is used as the explained variable in the stochastic frontier production function model. The input and output indicators of public governance efficiency set in this study are shown in Table 1.

Table 1: Input and output indicators of public governance efficiency measurement.

	Indicator Meaning	Method of measurement
Index of input	K (Capital - financial power)	Per capita fiscal expenditure
	L (Labor – Manpower)	Employment in public administration, social security and social organizations per 10,000 people
	E (Resources - Material resources)	Per capita state fixed asset investment
Indicators of output	Economic development capacity: Science and technology	Authorized number of domestic patent applications per 10,000 people
	Public goods provided: education	(Primary school teacher ratio + junior school student teacher ratio) /2 Number of beds in medical and health institutions per 1,000 population
	Resident welfare and equity	Number of people per 10,000 participating in unemployment insurance at the end of the year The inverse of the Gini coefficient and the Engel coefficient
	Foundation of Economic activity and environment	Wastewater discharge per unit of GDP Per capita disposable income of rural residents (Railway + highway mileage)/Land area of each province

3 ESTIMATE RESULTS

3.1 Analysis of Model Estimation Results

Stata16.0 software was used for regression analysis of model (5) and model (6) to estimate the influencing factors of input-output stochastic frontier production function and technical efficiency in the process of public governance. The estimated results are shown in Table 2 and Table 3 respectively. According to σ_v^2 and σ_u^2, can figure out that the γ coefficient is 0.9586.It shows that the variance of technical inefficiency contributes the most to the fluctuation of the whole public governance output, that is, the technical inefficiency item cannot be ignored. At the same time, it also shows that the variance of technical inefficiency can explain 95% of the total variance of the whole model. It can be seen that the setting of stochastic frontier function model is reasonable. η is greater than 0 and significant at 1%, indicating that it is acceptable that the technical efficiency of public governance will change over time. According to chibar2, the P value of 0.0000 rejects the null hypothesis at the 1% level H_0"There are no inefficiencies". That is, there is an inefficiency term.

Table 2: Regression results of input-output stochastic frontier production function in public governance process.

variable	Coefficient of estimation	Standard deviation	Z test
Financial input	-0.3706	0.4966	-0.75
Input of manpower	0.1035*	0.0531	1.95
Input of material resources	-0.6635*	0.3371	-1.97
Term of time	0.1927**	0.0756	2.55
Quadratic term of financial resources	-0.0122	0.0241	-0.51
Manpower secondary term	-0.0053	0.0049	-1.06
Quadratic material term	0.0080	0.0292	0.27
Time quadratic term	-0.0014**	0.0005	-2.68
Financial resources × manpower	0.0011	0.0075	0.15
Financial resources × material resources	0.0653	0.0451	1.45
Man × material	-0.0150**	0.0046	-3.25
Financial resources x time	-0.0007	0.0061	-0.11
Manpower × time	0.0025**	0.0008	3.13
Material resources x time	-0.0070	0.0049	-1.43
Term of constant	13.40607***	2.2081	6.07
σ_v^2	0.0028		
σ_u^2	0.0667		
γ	0.9586		
η	0.0145***		

Note: *, ** and *** are significant at the level of 10%, 5% and 1% respectively.

The technical efficiency of public governance in each province was measured under the same production frontier (Table 3). From the perspective of the total samples: first, the average technical efficiency of public governance in each province keeps improving, and the average of total samples rises from 0.4510 in 2007 to 0.5132 in 2020. However, the standard deviation of the total sample over the years decreased steadily from 0.1649 to 0.1510, indicating that the technical efficiency of public governance in various provinces gradually converged and the differences between provinces were decreasing. Second, in 2020, the average of the technical efficiency of public governance in all provinces is 0.5132. There are still relatively large losses of technical efficiency in Chinese public governance. Combining the measurement results of Table 3, we can find that the loss of technical efficiency of public governance mainly comes from management errors, that is, the technical efficiency of public governance will be further increased if we can better allocate factor resources or improve the management level pertinately in the process of public governance. Thirdly, take the 18th National Congress as the time node to plot the change of provincial average public governance technical efficiency. From the perspective of time dimension, the total factor productivity of public governance in western China has the fastest growth rate. The growth of total factor productivity of public governance in eastern China is relatively flat. From a national perspective, the western regions such as Ningxia, Xizang and Xinjiang, central provinces such as Henan, Hubei and Jilin, as well as the eastern provinces such as Guangdong and Guangxi, where the efficiency of public governance technology is relatively low, have a more obvious growth rate, while Shanghai, Beijing and Zhejiang have a smaller growth rate. In terms of the specific period, since the 18th CPC National Congress, the efficiency of public governance in all provinces has steadily improved, and the efficiency of public governance in central and western regions has significantly improved.

Table 3: Total samples and comparative analysis of technical efficiency of public governance in eastern, central and western China from 2007 to 2020.

year	Total sample size	
	Mean	Standard
2007	0.4510	0.1649
2008	0.4558	0.1639
2009	0.4607	0.1629
2010	0.4655	0.1618
2011	0.4703	0.1608
2012	0.4751	0.1597
2013	0.4799	0.1586
2014	0.4847	0.1576
2015	0.4895	0.1565
2016	0.4943	0.1554
2017	0.4990	0.1543
2018	0.5038	0.1532
2019	0.5085	0.1521
2020	0.5132	0.1510
Mean	0.4822	
Central Region		
Mean	Min	Max
0.4146	0.3733	0.4784
0.4198	0.3786	0.4835
0.4252	0.3840	0.4886
0.4304	0.3893	0.4937
0.4357	0.3947	0.4987
0.4409	0.4000	0.5038
0.4461	0.4053	0.5088
0.4513	0.4106	0.5138
0.4565	0.4160	0.5187
0.4617	0.4266	0.5237
0.4669	0.4213	0.5286
0.4721	0.4266	0.5335
0.4772	0.4318	0.5383
0.4823	0.4371	0.5432
0.4486	0.4424	
Western Region		
Mean	Min	Max
0.3355	0.2649	0.4047
0.3407	0.2700	0.4100
0.3406	0.2752	0.4153
0.3513	0.2804	0.4206
0.3566	0.2856	0.4259
0.3619	0.2908	0.4312
0.3672	0.2960	0.4365
0.3725	0.3013	0.4417
0.3778	0.3065	0.4470
0.3831	0.3118	0.4522
0.3884	0.3171	0.4574
0.3937	0.3224	0.4626
0.3990	0.3277	0.4678
0.4042	0.3330	0.4729
0.3698		
Eastern Region		
Mean	Min	Max
0.5745	0.3491	0.9609
0.5787	0.3545	0.9615
0.5828	0.3598	0.9620
0.5870	0.3652	0.9626
0.5911	0.3705	0.9631
0.5952	0.3759	0.9636
0.5992	0.3812	0.9641
0.6033	0.3866	0.9646
0.6073	0.3918	0.9651
0.6113	0.3973	0.9656
0.6153	0.4026	0.9661
0.6193	0.4079	0.9666
0.6232	0.4132	0.9671
0.6271	0.4186	0.9675
0.6011		

In order to better reflect the correctness of the direction of public governance reform since the 18th National Congress of the CPC, and further put forward the effective improvement path, we can analyze the factors causing the loss of public governance technical efficiency as a reference. This study analyzes the impact of three variables, government size, urbanization rate and per capita GDP, on technological loss, and the regression results are shown in Table 4.

In terms of the natural conditions affecting the technical efficiency of the output of public governance, the estimated coefficient of government scale is -0.0063, and is significant at the level of 1%, indicating that the expansion of government scale is conducive to the improvement of public governance efficiency. However, from the point of view of the value, its influence is not obvious, which can also reflect that the scale of the government follows the rationality of moderation and optimal. In terms of the technical conditions affecting the technical efficiency of public governance output, the estimated coefficient of urbanization rate is -0.3177, which is significant at the 1% level, indicating that the improvement of urbanization rate is conducive to improving the technical efficiency of public governance. With the continuous development of the economy and society and the continuous improvement of the urbanization rate, the price of the corresponding factors will continue to rise. Based on the theory of "induced technological change", the improvement of technological productivity can replace some input factors of public governance or enhance the accuracy of identifying public service demands, thus helping to improve the efficiency of public governance. In terms of regional economic factors affecting the technical efficiency of public governance output, the estimated coefficient of per capita GDP is -23.8248, which is significant at 1% level, indicating that the level of economic development is positively correlated with the technical efficiency of public governance. Generally speaking, the higher the level of economic development, the better the ability to improve production technology, which also explains the higher efficiency of public governance in the eastern region. At the same time, the value of per capita GDP estimation coefficient reflects the importance of high-quality economic development to the improvement of public governance efficiency, and the two are mutually promoting relationship.

Table 4: Regression results of influencing factors of public governance technology loss.

variable	Coefficient of estimation	Standard deviation	Z test
Size of government	-0.0063***	0.0012	-5.24
Rate of urbanization	-0.3177***	0.0095	-33.25
GDP per capita	-23.8248***	2.6214	-9.0
constant	0.8466***	0.0059	142.60
Wald chi2（3）	4579.89		
Prob≥ chibar2	0.0000		

Note: *, ** and *** are significant at the level of 10%, 5% and 1% respectively.

3.2 Efficiency Decomposition of Public Governance

According to the quadruple decomposition model of total factor productivity, the efficiency of public governance can be divided into four parts: the first part and the second part are the technological change and technological efficiency change of public governance, and the third part reflects the change of scale efficiency. If the scale efficiency is greater than 0, it indicates that in the process of time change, the increase of factor input caused by the change of scale efficiency can promote the growth of public governance efficiency. The fourth part is the change of factor allocation efficiency, which reflects the degree of deviation between factor elastic share and factor cost share, and is an index to measure the inefficiency of factor allocation. When the allocation efficiency is less than 0, it indicates that the invalid allocation of factors over time will inhibit the growth of public governance efficiency. Considering the lack of certain standards for the cost measurement of factor input in the public governance process, it is difficult to find a suitable reference for the calculation of factor allot efficiency. Therefore, this paper conducts decomposition and empirical analysis on technology change (ΔT), technology efficiency change (ΔTE), total factor productivity change (ΔTFP) and scale efficiency change (ΔSE) in public governance efficiency, and the results are shown in Table 5. With the passage of time, the technical efficiency of public governance increases gradually and becomes stable. The potential cause of this phenomenon may be the low efficiency of technology promotion. Although technological innovation is active and new technologies keep emerging, due to the lack of resources and other factors, public governance subjects cannot quickly adopt efficient new technologies in a short period of time, and the traditional governance concepts of many governments also hinder the improvement of the technical efficiency of public governance to some extent. In addition, the scale efficiency of most regions remains at a low negative level close to 0, indicating that the increase of factor input caused by the change of scale efficiency of public governance may inhibit the growth of efficiency over time. This also indicates that the current government-led governance subject has not fully brought out the enthusiasm of the reform of public governance and cannot generate scale effect. Therefore, it is very necessary to explore the concrete measures to stimulate the circulation of factors.

Table 5: Public governance efficiency growth and its decomposition.

region	ΔTFP	ΔTE	ΔT	ΔSE
west	0.372854	0.287173	0.076297	-0.021427
middle	0.449635	0.248337	-0.048386	-0.000543
east	0.58967	0.256643	-0.125129	-0.010624
Total	0.48512	0.267500	-0.061863	-0.010404

4 CLASSIFICATION OF COUNTY GOVERNMENT BASED ON DECISION TREE C4.5 ALGORITHM

By 2020, China has 2,844 county-level administrative regions, 2,084 of which have been included in the China County Statistical Yearbook 2020. Due to the different conditions of resource endowment and development of each county, the research on the efficiency of public governance cannot be generalized. By improving the traditional regional division, counties in each province can be further divided into several types according to the three characteristics of regional area, population and urbanization level, which is convenient to explain the influence of relevant factors on the efficiency of public governance. Therefore, based on the decision tree C4.5 algorithm, the regional area, population and urbanization level are divided into three characteristics, namely large (large, high), medium (general) and small (small, low), with a total of 27 types. The type with more than 15 cities is selected for analysis.

The decision tree C4.5 algorithm uses the gainratio and selects the most suitable attribute according to the different attributes of the sample training set to judge the sample type.

The greater the information entropy is, the greater the disorder degree of data is. According to the classification of maximum information gain, the nodes of regional area, population and urbanization level can be obtained as shown in Table 6. The urbanization level is measured by (number of people in the secondary industry + number of people employed in the tertiary industry)/permanent population. The step is to first divide the urbanization level of 2,084 county-level administrative regions to get the nodes of urbanization level division, and then divide the geographical area of 2,084 county-level administrative regions. Based on the regional division, the population is divided, as shown in Table 6. A1-A27 is named according to the level of urbanization, population and area.

Table 6: Decision tree classification of public governance cities.

type	Numbr of cities	Northeast -1	East Coast-2	North -3
A1	7			
A2	53		14	
A3	78		40	5
A4	4			1
A5	29		8	
A6	94		42	7
A7	13			
A8	9			2
A9	49		15	10
A10	44	10	5	1
A11	121	5	27	2
A12	96		51	4
A13	21	5		
A14	131	2	28	9
A15	155	2	41	44
A16	43	2		
A17	97	5	14	14
A18	196	3	27	45
A19	50	12	1	1
A20	27	2	9	
A21	10		1	1
A22	59	11		1
A23	87	11	9	3
A24	47		3	8
A25	82	7		
A26	95	11	3	10
A27	92	2	8	30

West -4	Middle -5
3	4
8	31
2	31
3	
8	13
12	33

13	
6	1
15	9
12	16
38	49
13	18
16	
54	38
41	27
41	
48	16
71	50
32	4
5	11
1	7
46	1
52	12
14	22
75	
69	2
35	7

A1-A9 are counties with high urbanization level, A10-A18 are counties with average urbanization level, and A19-A27 are cities with low urbanization level. It is not difficult to find that the level of urbanization in Northeast China is in the second and third grade, the eastern coastal cities are concentrated in the first and second grade, the North and western cities are concentrated in the second and third grade, and the central cities are more average. According to the results of model 6, urbanization rate and per capita GDP have a significant negative impact on efficiency loss. To some extent, it reflects that the level of economic development will positively affect the efficiency of public governance, which is also an important reason for the regional development of the efficiency of public governance. This also confirms the spatial spillover of government governance efficiency (He Baocheng et al.,2021). On the one hand, regions with high governance efficiency will bring "learning effect" and "demonstration effect", driving the upgrading of surrounding industrial structure, optimization of governance policies and improvement of expenditure structure, thus stimulating the positive spillover of efficiency. On the other hand, regions with high efficiency have relatively higher quality of economic development, infrastructure, public services and market environment, which will attract the inflow of factor resources, resulting in the "siphon effect", leading to the polarization clustering of high-end industries such as knowledge and technology, thus exacerbating the differences in government governance efficiency.

5 CONCLUSION

According to research and analysis, the efficiency of public governance in China has increased steadily since the 18th National Congress of the Communist Party of China, with the highest in the eastern region, which is related to the level of economic development and the better optimization of government scale. The efficiency of public governance in the western region has been significantly improved, which shows that with the advancement of the modernization of national governance, the western region has also experienced new development. In the future, we should continue to optimize the scale of the government and constantly improve the rational flow of production factors.

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