



DYNAMIC EVALUATION AND DETERMINANTS OF CHINA'S INTER-REGIONAL EQUALIZATION OF BASIC PUBLIC SERVICES

Zhang Qichun ^a, Tang Xuebing ^b

^a Full Professor, Ph.D, Huazhong Normal University, School of Economics and Business Administration, Wuhan, China, 1/1, zhangqich@gmail.com.

^b Assistant Professor, Ph.D, Huazhong Normal University, School of Economics and Business Administration and Sociology Mobile Station for Post-Doctoral Research, Wuhan, China, xuebingt@126.com, Corresponding Author.

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ABSTRACT

Despite the 30 years of reform and opening up that has led to China's rapid economic development, the gap of basic public services, such as basic education and medicine, among regions in China widened, which forced the Chinese government to put forward the strategy on Equalization of Basic Public Services (BPS) in 2005. Through econometric analysis, this paper analyzes the reasons why the regional equalization level of BPS in China has been decreasing. We find that the level of regional gaps of economic development, differences in fiscal decentralization, the degree of opening to the outside world and of marketization, and the level of urbanization are significantly positively correlated with the level of regional BPS; while regional disparity of financial capacity and governments' preferences are significantly negatively correlated with the level of regional BPS; but transfer payments from the central government do not play a role in promoting the equalization of BPS. It can be seen that in order to raise regional equalization of BPS in China, the gap of regional economic development should be controlled within reasonable ranges, normative fiscal decentralization established, and the system of transfer payments reformed with explicit equalization goals in mind. At the same time, the central government should reform the current rigid system of household registration management or internal passport system, known as hukou. To ensure the rational flow of population, and it should force local governments to improve the supply of BPS rather than simply relying on competition for regional economic growth.

I. INTRODUCTION

Since the Reform and Opening-up policy was implemented 30 years ago, all levels of government in China have played such a small role in the field of basic public services (BPS) that a serious shortage of BPS affecting people's welfare has not been developed as rapidly as economic growth has happened; therefore education, health, and housing have become the "new three big mountains" to conquer in the minds of the people. At the same time, because of the inconsistency of China's regional economic development, the gap in the economic development between the eastern regions and the central-western regions has gradually been widening, which creates a huge gap in China's regional BPS. This situation has not been helped by uncertain goals and non-standardized operation of the existing inter-governmental transfer payment. Nowadays China's BPS has been characterized as "low performance level, imbalanced development, and low-level efficiency converging" (Chen Changsheng and Cai Yuazhou, 2007). However, in order to provide inter-regional equalization of BPS to build a service-oriented government within a "harmonious society" and to reduce regional economic disparities, the current expansion of China's government financial capacity and the transformation of governmental functions lay a solid economic and political foundation for the Chinese equalization of BPS. Therefore, researching the equalization of regional BPS has important practical and theoretical significance within the context of current political and economic policy in China.

This paper's contribution is mainly reflected in two aspects. Firstly, we build a system for evaluation of China's inter-provincial equalization of BPS by means of an Eigenvalue method with Experts' Questionnaire, and analysis of basic characteristics of the equalization of BPS.

The current literature has produced more qualitative research and much less quantitative research on China's inter-provincial evaluation system of the equalization of BPS. Chen Changsheng and Cai Yuazhou (2007) constructed by far a most comprehensive performance evaluation system of BPS, and they choose 165 indicators to research eight BPS. But they focused on regional differences in the performance of China's BPS. An Tifu and Ren Qiang (2008) chose 7 BPSs of 16 single indicators to measure China's inter-provincial equalization level of BPS from 2000 to 2006. In addition, there are some other scholars such as Chen Zhenming and Li Deguo (2011), Wang Xin-min and Nan Rui (2011), Luo Yongmin and Fan Liming (2011), Ma Huiqiang, Han Zenglin and Jiang Haixu (2011) who using some indicators studied the equalization degree of BPS between within province, between provinces, between urban and rural areas, respectively.

Since they chose too few indicators that are stocks in nature, their analysis would lead to richer regions strengthening their advantageous position. This study is bound to draw the conclusion that the gap of China's inter-provincial BPS has been widening, which cannot reflect that poorer regions have improved their BPS level year by year¹. At the same time, the research interval is too short to draw reliable and scientific conclusions.

The evaluation system built into this paper is made of 35 indicators of China's inter-provinces from 1996 to 2006, including basic education, public health and basic medical care, public culture, basic scientific research, employment and social security, public infrastructure and environmental protection as second-level indicators and China's inter-provincial BPS index as the first-level indicators. We find that China's inter-provincial equalization of BPS has experienced lower levels, and it shows a downward trend. The equalization level of all kinds of BPS varies significantly. The services whose equalization level is relatively reasonable are public cultural services, public infrastructure services, and ecological and environmental protection services. The

¹This could be possibly richer regions experience faster increase than poverty regions in BPS.

services whose equalization level must be improved are employment and social security services, public health and basic medical services. The services whose equalization level is urgent to increase are basic education and basic R&D services.

Secondly, we make use of panel data to analyze the determinants of inter-provincial equalization levels of BPS in China. Presently, there are rather few papers which use qualitative analysis to look into determinants of inter-provincial equalization level of BPS in China, and most papers focus on transfer payments(Xiaoning Song et al, 2008; Yongzheng Liu, 2008). These papers have adopted a relatively narrow perspective, neglecting other factors potentially affecting the equalization level of BPS.

Through the econometric analysis in this paper, we research the reasons why the regional equalization level of BPS in China has been decreasing. We find that several variables play significant roles, including the level of regional gaps of economic development, differences of fiscal decentralization, the degree of opening to the outside world and marketization, and the level of urbanization which significantly are all positively correlated with the level of regional BPS. Regional disparity in financial capacity and governments' preferences are negatively and significantly correlated with the level of regional BPS.

We also find that transfer payments from the central government do not play a role in promoting the equalization of BPS. It can be seen that in order to raise regional equalization of BPS in China, the gap of the regional economic development should be controlled within reasonable ranges, and normative fiscal decentralization and the system of transfer payments should be reformed with this objective in mind. At the same time, the central government should reform the current rigid system of household registration management to ensure the rational flow of the population, and it should force local governments to improve the supply of BPS rather than simply relying on the competition of regional economic growth.

The rest of the paper is organized as follows: Section 1 builds the dynamic evaluation system of China's inter-provincial equalization of BPS and analyzes its characteristics from 1996 to 2006. Section 2 presents the main results concerning determinants of China's Inter-Regional Equalization of BPS. Section 3 concludes.

II. DYNAMIC EVALUATION SYSTEM AND ASSESSMENT RESULTS OF CHINA'S INTER-PROVINCIAL EQUALIZATION OF BPS

A. Selecting and designing the dynamic evaluation system

Basic public services(BPS) should have the minimum scope and boundaries in a certain stage according to the overall level of economic and social development of a country, in order to maintain economic and social stability in the country, social justice and cohesion and to protect individual basic right to life. In practise, Many statistical indicators only reflect one side of BPS. Therefore, it is necessary to translate many indicators into a single index to reflect overall developmental trend of BPS by certain technical means such as input-output methods(Chen Changsheng and Cai Yuazhou, 2007) or dual-tier indicators rating(An Tifu and Ren Qiang, 2008) .In this paper, the dynamic evaluation system of China's inter-provincial equalization of BPS is divided into a three-tier rating system, which expand the dual-tier indicators rating ways.

The first indicator is the inter-regional equalization index of BPS. In accordance with the connotation of inter-regional equalization of BPS, the indicator is set up as measuring the level of China's inter-provincial equalization of all kinds of BPS. Thus, the first indicator is the coefficient of variation, so the greater the value of the first indicator, the lower the degree of China's inter-provincial equalization of BPS.

The second set of indicators includes basic education, public health and basic medical care, public culture, basis scientific research, employment and social security, public infrastructure and environmental protection; all are considered segundo indicators of China's inter-provincial BPS. The selection of these indicators not only stresses the importance of basic public services as public goods, but also stresses the importance of current financial constraints and requirements of the government's overall strategic objectives.

The set of third indicators must consider its corresponding representation according to the segundo ones, and its availability. At the same time, the third indicators must be expressed in per capita terms indicators to avoid the impact of population size. Finally, some of the third set of indicators must be flow nature indicators and others of a stock nature. Because the main goal of Chinese governments gradually has been transferred from economic construction to the provision of public services, flow indicators can reveal the improvement of he provision of BPS.

To sum up, every segundo indicator is made up of 5 to 7 third indicators. Therefore we choose 35 third indicators for the make up of a dynamic evaluation system of China's inter-provincial equalization of BPS, as shown in Table 1.

TABLE 1-CHINA'S INTER-PROVINCIAL EQUALIZATION EVALUATION SYSTEM OF BPS

| First indicator | Second indicator | Third indicator | units |
|--|---|---|-----------------|
| China's inter-provincial equalization index of BPS | Basic education | Budget expenditure on education of every students in primary school | Yuan/student |
| | | Budget expenditure on education of every students in junior school | Yuan/student |
| | | Budget expenditure on education of every students in high school | Yuan/student |
| | | Full-time teachers of every student in ordinary primary school | person/student |
| | | Full-time teachers of every student in ordinary secondary school | person/student |
| | Public health and basic medicine | Budget expenditures per capita health expenditure | Yuan per capita |
| | | The number of beds per 10,000 people | piece |
| | | The number of doctors per 10,000 people | number |
| | | Water coverage in city | % |
| | | The number of public toilets in city per 10,000 people | number |
| | Public culture | Expenditure of culture and sports broadcasting per capita | Yuan per capita |
| | | Broadcasting population coverage | % |
| | | TV population coverage | % |
| | | The number of public libraries per 10,000 people | number |
| | | The fees of three items in technology per capita | Yuan per capita |
| | Basic R&D | Technology spending per capita | Yuan per capita |
| | | The number of domestic invention patent per 10,000 people | item |
| | | The number of domestic design patent per 10,000 people | item |
| | | The number of domestic newly application patent per 10,000 people | item |
| | | The registered urban unemployment rate | % |
| | Employment and social security services | Per capita expenditure on social security | Yuan per capita |
| | | The ratio of Old-age insurance to total population | % |
| | | The ratio of medical insurance to total population | % |
| | | The ratio of industrial injury insurance to total population | % |
| | | The ratio of maternity insurance to total population | % |
| | Public infrastructure | The ratio of unemployment insurance to total population | % |
| | | The number of owned mobile phone by per 100 people | number |
| | | The capacity of owned telephone exchanges by per 100 people | number |
| | | The number of owned local telephone by per 100 people | Hu |
| | | highway mileage per capita | M |
| Ecological services and Environmental protection | Urban public green area per capita | m ² | |
| | Integrated utilization rate of industrial solid waste | % | |
| | Green area of the urban park per capita | m ² | |
| | The ratio of nature reserve area to land area | Hectare/10,000 hectares | |
| | The ratio of Comprehensive utilization value of waste products of industrial to industrial output value | % | |

Source: THIRD INDICATORS MAINLY COME FROM CHINA STATISTICAL YEARBOOK 2006.

B. Assessing method

It can be seen that BPS can be divided into 7 categories, so that the evaluation of the equalization system of BPS is a multi-dynamic comprehensive evaluation method. It is necessary to use a certain mathematical model of multiple indicators into a set of holistic indicators. This paper sets up a dynamic evaluation system of China's inter-provincial equalization of BPS using the Experts' Questionnaire² and Eigenvalue methods. These are calculated as follows:

If X_{ijt} is an original indicator of region i at time t in service j , P_{it} is the population size of region i at time t . Step I: Pre-treatment of evaluation indicators. First of all, the aggregate indicators are converted into per capita indicators as follows:

$$\bar{X}_{ijt} = \frac{X_{ijt}}{P_{it}} \tag{1}$$

Then, we proceed the uniformization of the indicators. Since some are expressed only as minimum values (The smaller, the better) indicators—such as the registered urban unemployment rate, we do the conversion, thus:

$$\bar{X}_{ijt} = 1 - X_{ijt} \tag{2}$$

This indicator has been translated into maximum value one. As for the relative indicators, they remain unchanged as $\bar{X}_{ijt} = X_{ijt}$. Finally, the dimensional indicators must be translated into dimensionless ones. If M_{jt} and m_{jt} is the maximum and minimum values of \bar{X}_{ijt} , then we can write:

$$x_{ijt} = \frac{\bar{X}_{ijt} - m_{jt}}{M_{jt} - m_{jt}} \tag{3}$$

It is clear that the range of (3) is dimensionless with the indicators being between [0, 1]. Step II: We send a questionnaire to 10 experts and ask them for the relative importance of the indicators in Table 1. Then according to these experts' answers, we rank the indicators and give them different weighted value (ranking the more highly weighted higher) p_{ij} . Step III: we determine the weighted value of third indicators by the eigenvalue method. If the 7 sub-categories of services as a sub-system, and x_{ijt} is an indicator after pre-treatment of sub-system x in region i at time t item j , then the transform $x_{ijt}^* = p_{ij}x_{ijt}$, and these data can form the matrix:

$$A_t = \begin{pmatrix} x_{11}^* & x_{12}^* & \dots & x_{1m}^* \\ x_{21}^* & x_{22}^* & \dots & x_{2m}^* \\ \dots & \dots & \dots & \dots \\ x_{n1}^* & x_{n1}^* & \dots & x_{nm}^* \end{pmatrix} \tag{4}$$

²Choice standard of experts is professional and familiarity. Professional requires these experts to take mainly on researching public finance and regional economics. Familiarity requires these experts to be familiar with the situation of provision of public services in China. We ask for the experts ranking the sub-BPSs and give more weigh to avarage ranking first. The experts mainly come from Finance Department, Chinese Academy of Social Science and some famous Universities such as Remin University and Huazhong Normal University, and so on.

We structure the symmetric matrix $H_t = (A_t)^T A_t$, and then we calculate the maximum eigenvalue λ_{\max} and the corresponding eigenvector b_j of H_t . Finally, we normalize b_j ($j = 1, 2, \dots, m$) to achieve the weighted coefficient of indicators x_{ijt} :

$$w_{jt} = \frac{b_j}{\sum_{j=1}^m b_j} \tag{5}$$

Step IV: We obtain the comprehensive evaluation function of the secondary sub-system function in region i at time t .

$$s_{it} = \sum_{j=1}^n w_{jt} x_{ijt} \tag{6}$$

s_{it} represents the relative developmental degree of some certain kinds of BPS.

Step V: We calculate the coefficient of variation (CV) to evaluate the equalization level of sub-BPS at time t .

$$cv_t = \frac{\sqrt{\frac{\sum_{j=1}^n (s_{it} - \bar{s}_t)^2}{n-1}}}{\bar{s}_t} \times 100\% \tag{7}$$

\bar{s}_t is the average value of sub-BPS at time t all regions. The greater cv_t is, the lower the degree of equalization of sub-BPS is.

Step VI: In fact, the relative importance of sub-BPS may differ. Based on The Experts' Questionnaire approach, we get the weighted coefficients u_i of sub-BPS, and finally obtain the composite indicator of BPS for all regions S_{it} :

$$S_{it} = \sum_{i=1}^7 u_i s_{it} \tag{8}$$

Then we calculate the coefficient of variation of S_{it} :

$$CV_t = \frac{\sqrt{\frac{\sum_{i=1}^n (S_{it} - \bar{S}_t)^2}{n-1}}}{\bar{S}_t} \times 100\% \tag{9}$$

\bar{S}_t represents the average value of overall BPS at time t all regions. The large values of CV show a lower degree of equalization of BPS.

Step VII: Repeat the above steps, and calculate cv_t and CV_t at time t to obtain the evolution profile of equalization levels of BPS in China over time.

C. Data sources and assessment results

With some limitations from the data's availability and integrity, we collected provincial data from 1996 to 2006, except for Tibet. Most of the data came from the following sources: "China Statistical Yearbook" from 1997 to 2007, "China Compendium of Statistics" from 1949 to 2004, "New China Fifty Years' Government Finance Statistics", "Finance Yearbook of China" from 1997 to 2007, "China Educational Finance Statistics Yearbook" from 1997 to 2007, Provincial Statistics Yearbook, and CEI Statistical Database.

After applying the methodology above, we obtained China's inter-provincial equalization index of BPS, which is shown in Table 2.

TABLE 2-CHINA'S INTER-PROVINCIAL EQUALIZATION INDEX OF BPS(1996-2006)

| year | BPS | basic education | public health and basic medicine | public culture | basis scientific research | employment and social security | public infrastructure | environ mental protection |
|------|-------|-----------------|----------------------------------|----------------|---------------------------|--------------------------------|-----------------------|---------------------------|
| 1996 | 0.466 | 0.71 | 0.545 | 0.386 | 1.242 | 0.525 | 0.496 | 0.402 |
| 1997 | 0.456 | 0.762 | 0.537 | 0.355 | 1.195 | 0.339 | 0.503 | 0.392 |
| 1998 | 0.495 | 0.77 | 0.538 | 0.328 | 1.135 | 0.6 | 0.492 | 0.398 |
| 1999 | 0.478 | 0.805 | 0.527 | 0.332 | 1.263 | 0.466 | 0.47 | 0.438 |
| 2000 | 0.487 | 0.834 | 0.627 | 0.3 | 1.203 | 0.465 | 0.435 | 0.358 |
| 2001 | 0.511 | 0.838 | 0.6 | 0.327 | 1.325 | 0.613 | 0.466 | 0.367 |
| 2002 | 0.513 | 0.856 | 0.632 | 0.33 | 1.328 | 0.49 | 0.451 | 0.405 |
| 2003 | 0.502 | 0.88 | 0.577 | 0.363 | 1.375 | 0.507 | 0.432 | 0.363 |
| 2004 | 0.499 | 0.896 | 0.555 | 0.364 | 1.36 | 0.534 | 0.454 | 0.355 |
| 2005 | 0.542 | 0.899 | 0.751 | 0.389 | 1.362 | 0.586 | 0.437 | 0.393 |
| 2006 | 0.523 | 0.94 | 0.563 | 0.374 | 1.386 | 0.666 | 0.379 | 0.403 |

Source: Author's calculation.

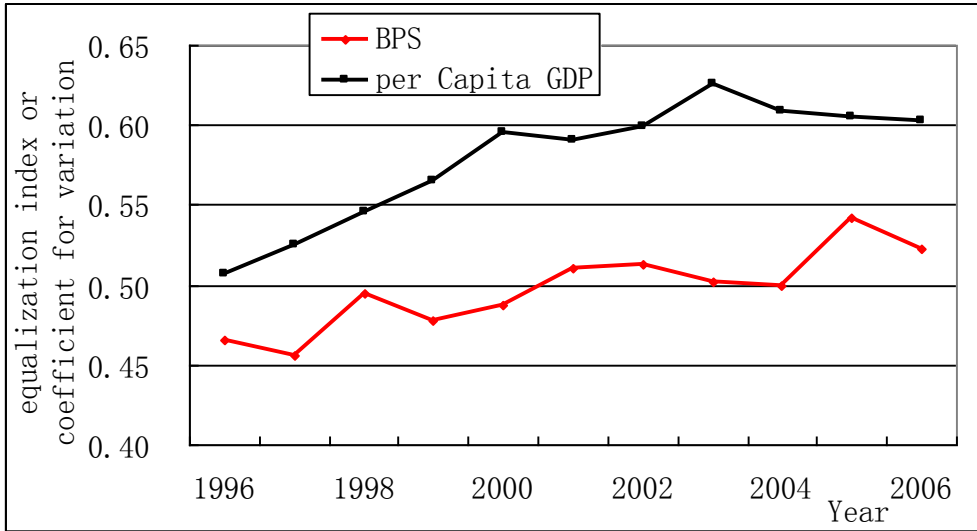
From the overall level and organic composition of China's inter-provincial equalization index of BPS, respectively, we can draw following conclusions:

Firstly, China's inter-provincial equalization level of BPS has decreased and shows a downward trend. As can be seen in Table 2, this index has remained above the 0.45 level, with 0.54 the highest observed mark of 2005. The highest was observed in 2005. This result basically validates the conclusion drawn by Changsheng Chen et al (2007). The BPS in China shows "low performance level, imbalanced development, and low-level efficiency converging". The overall equalization index presented an upward trend that peaked in 2005 and declined slightly in 2006. This shows that the gap of inter-provincial BPS in China may be gradually widening. Fortunately, the index in 2006 is less than the one in 2005, which shows that the deteriorating trend of equalization degree of BPS could be improved. Owing to more emphasis on the implementation of BPS from the central government and governments at all levels recently, inter-provincial the equalization level of BPS in China may gradually show increase in the future.

In order to compare it with the inter-provincial economic gap, we also calculated the inter-provincial weighted coefficient for variation of per capita GDP in China from 1996 to 2006, as can be seen in Figure 1. The coefficient for variation of per capita GDP has been greater than the equalization index of BPS, which accounts for the inter-provincial gaps in BPS being less than

the gap of economic development, and therefore the fiscal system would appear to be producing some equalization results. It is noteworthy that the economic gap between China's provinces has been gradually reduced since 2003, and that the equalization index of BPS began to decline in 2006, lagging 3 years.

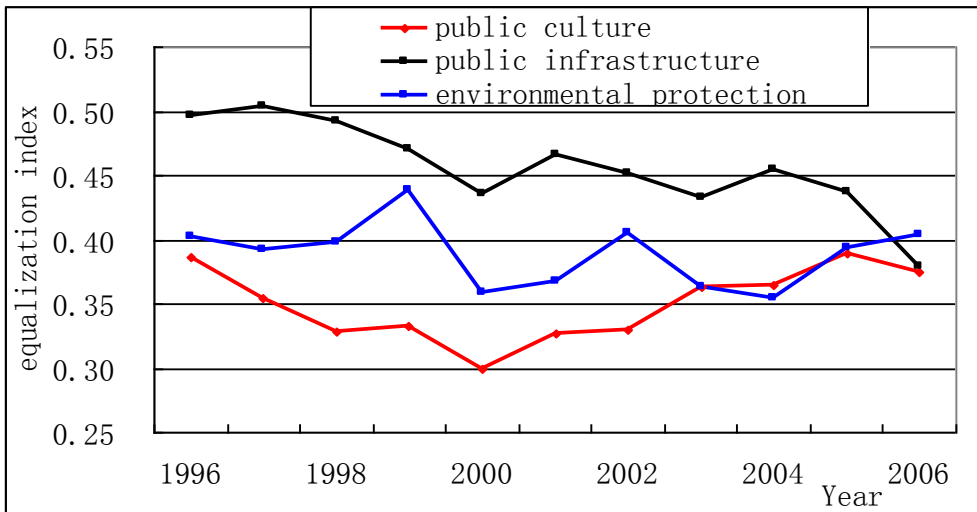
FIGURE 1.CHINA'S INTER-PROVINCIAL EQUALIZATION INDEX OF OVERALL BPS(1996-2006)



Source: Author's calculation.

Secondly, sub-BPS vary significantly in their equalization degree. Based on the average equalization level of sub-BPS in 2002-2006, 7 sub-BPS can be divided into three categories—relatively reasonably well-provided services, must-improved services, and urgent-to-improve services.

FIGURE 2.CHINA'S INTER-PROVINCIAL EQUALIZATION INDEX OF PUBLIC CULTURE, PUBLIC INFRASTRUCTURE, ECOLOGICAL SERVICES AND ENVIRONMENTAL PROTECTION (1996-2006)

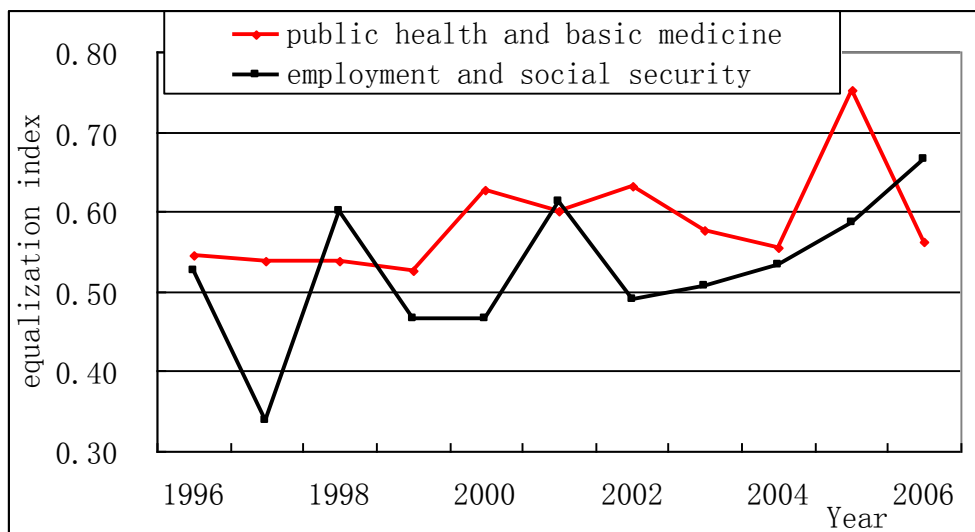


Source: Author's calculation.

Relatively reasonably well-provided services of equalization degree include public culture, public infrastructure, ecological services and environmental protection. As can be seen in Figure 2, the equalization index of the above-mentioned three sub-services in the recent 5-year period were below 0.45 during the recent five years, which placed them under the overall equalization index of BPS. This indicates that these three sub-services were on a relatively higher equalization degree rate, and the gap among them was controlled within a reasonable extent. However, the trajectories of these three sub-services differ. The equalization trajectory for public culture has a "U-type", showing that the gap between provincial public cultural services widened first and then narrowed. The reason for this is because of the relative neglect of the construction of public cultural facilities until recently.

"Must-improved services of equalization degree" include employment and social security services, and public health and basic medical services. The equalization indexes for these two sub-services have been between 0.5 and 0.8, in a middle level among 7 sub-services, so their equalization degrees need improving. The trajectory of public health and basic medical services has been relatively stable (except in 2005) due to this service being stock investment mostly by governments. Regional economic development determines governments' input into public health and medical services, resulting in a regional economic gap the same as the gap for public health and basic medical services(Qin Liu,et al,2010). The equalization index for employment and social security services tended to decrease recently, indicating that the regional gap of this service may be gradually widening. This is mainly because the increase of coverage and security standards depends on regional urbanization, living standards and the size of the government's finance. Developed provinces and cities, owing to local increases in urbanization and living standards, and governments' annual revenue increasing much higher than GDP growth, have been sufficiently funded to increase fiscal expenditure of local job training and social security standards, which leads to the growing gap for this service.

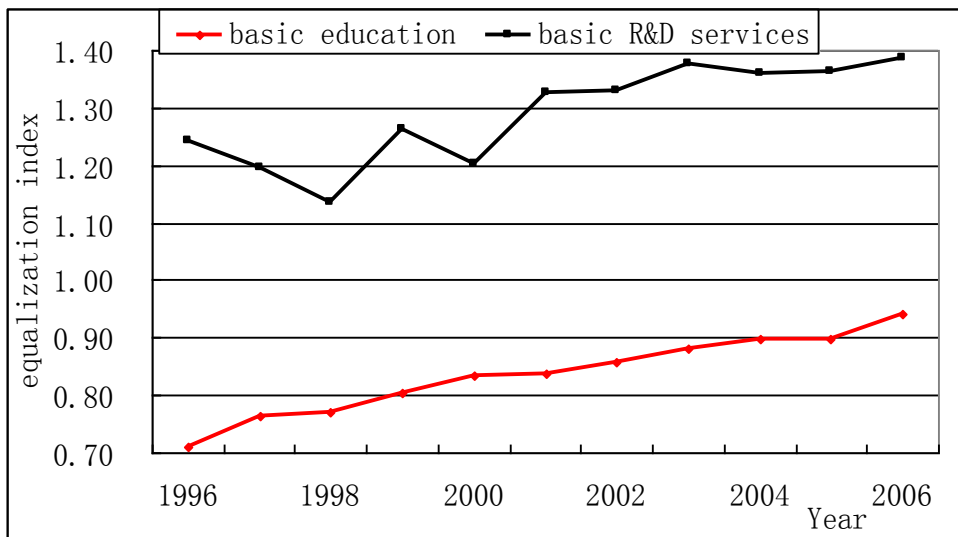
FIGURE 3.CHINA'S INTER-PROVINCIAL EQUALIZATION INDEX OF EMPLOYMENT AND SOCIAL SECURITY SERVICES, PUBLIC HEALTH AND BASIC MEDICAL SERVICES (1996-2006)



Source: Author's calculation.

In the urgent-to-improve services category, we find the basic education and basic R&D services. The average equalization index of basic education and basic R&D services is up to 0.894 and 1.362, respectively, the highest in the 7 sub-services; therefore it would appear urgent for these two services to improve their equalization degree. As can be seen from Figure 4, the equalization index for basic education has increased from 0.71 in 1996 to 0.94 in 2006, witnessing the growing gap in basic education in China. Although the central government has stressed the importance of basic education, the educational input mechanism of "one-province-one-entity" has strengthened the inter-provincial disparities in basic education. Base on Paul R. Blackley, Larry DeBoer(1987), with the rapid economic growth in China, person's basic wants would shift away from physical capital towards human capital wants, and huge educational gap would expand their welfare gap of different regions.

FIGURE 4.CHINA'S INTER-PROVINCIAL EQUALIZATION INDEX OF BASIC EDUCATION AND BASIC R&D (1996-2006)



Source: Author's calculation.

At the same time, basic education shares a much larger weight in the entire BPS, so that improvements in the equalization degree of basic education contribute to raise the overall equalization degree of BPS. The equalization index of basic R&D services has remained at 1.3 or above in the past five years, which accounts for the fact that the gap of regional basic R&D services has been widening to a shocking extent, and therefore the government must attach more importance to these services. In recent years, most of China's basic research funds have been input into developed regions where most of the nation's research institutes and universities are concentrated. As a result of the lack of research funding in backward regions, high-quality talents in scientific research are reluctant to work in backward regions. This vicious circle leads to the growing gap in basic R&D services.

III. THE DETERMINANTS OF CHINA'S INTER-REGIONAL EQUALIZATION OF BPS

A. Model settings

The analysis of the determinants of China's inter-provincial equalization of BPS should begin with the supply and demand of BPS in China.

From the perspective of supply factors, the degree of regional economic development significantly impacts the local supply capacity of BPS. If local governments' tax rates are the same, then the higher the level of local economic development, the more financing is available, the more local BPS the developed regions have, and consequently the greater the gap between the developed and developing regions becomes. However, it should be noted that local residents in developed regions demand local governments to supply higher quality and quantity of BPS and would appear to strongly reject non-resident populations sharing local BPS, owing to perceived crowding effects and, in a sense, holding the perception of local BPS as club goods. Therefore, the gap in the economic development level has a negative correlation with the equalization of BPS; that is, the greater the gap in per capita GDP, the greater the equalization degree of BPS is.

What's more, transfer payments from the central government to local governments can make up for the insufficient supply capacity of BPS at the local government level. Therefore, a rational transfer payment system should serve as a tool of equalizing BPS. But the transfer payment system in China is set up mainly based on political considerations rather than economic ones, with the presence of non-standard and non-transparent transferring and so on. So transfer payments in China play a very small equalizing role, or they may actually play a reverse role in equalizing BPS.

Another important supply factor of BPS is the governments' preferences (Andreu Mas-Colell, 1980). The decision-making mode for public goods such as basic education and infrastructure for governments at all levels in China has been following a top-down mode, and central governments' performance evaluation criteria have emphasized GDP, leading government units at all levels to prefer the supply of hard public goods such as roads, bridges, and so on, to the supply of soft public goods such as basic education, social security, public health and basic medicine. Some local governments are even in arrears with teachers' wages in primary schools. So the local preference for hard public goods also has an impact on the supply level of BPS.

From the perspective of demand factors, local marketization degree, local level of economic openness, local urbanization rate, and the industrialization rate have significantly affected China's inter-regional demand of BPS.

Domestic and foreign scholars generally believe that China's market-oriented reform has put vitality into the Chinese economy and has improved the efficient use of resources. However, the degrees of market-oriented progress between eastern and western regions are obviously very uneven. At the same time, the higher level of marketization degree demands improved government functions, so that local residents and businesses will progressively increase quantity and quality of the supply capacity of the local government for BPS such as basic education. But an excessive marketization degree may also lead to some BPS services being privatized, resulting in the lack of some BPS. Though in developed countries, some education services are produced privately, it could reduce inequality. In China, due to large population, lack of the stock of public services and governments' supervision, the rich enjoy the provision of public services privately mainly, so the provision of BPS privately maybe reduce the equalization of BPS.

So the relationship of marketization degree and equalization level of BPS is uncertain. A rising level of opening to the outside world means the increase in foreign-funded enterprises

locally. Generally, the location choice of foreign-funded enterprises is in the region which has the better quality of BPS. Therefore, the rising of the level of opening-up often is accompanied by the growing of local BPS. In general, the development of city and industry must be based on high-quality development of BPS. The higher urbanization rate means more demand for BPS in the unit of land area and decreasing unit costs of supplying BPS owing to economies of scale.

According to the supply-and-demand factors of BPS, we can generally explain why China's inter-provincial equalization level of BPS continues to be low. With the gradual deepening of the reform of China's socialist market economy, the gap of economic development in China's various regions has widened, and the financial gap among regions correspondingly has also begun to widen. So if every region continues to rely solely on its own revenue for the provision of BPS, the gap of BPS among regions is very likely to widen.

At the same time, China's reform and opening up is also the process of gradual financial decentralization. During this process, the central government gradually took up much more proportion of fiscal revenue, resulting in the gradual inconsistencies with affair rights and wealthy rights of governments at all levels. This requires the central government to carry out transfer payments to local governments to make up for the insufficient supply of BPS. However, due to its defects, transfer payment does not play a role in equalizing BPS. What's more, local governments do not prefer soft public goods such as basic education during this period of speeding up industrialization and urbanization, thereby leading to an inadequate supply of BPS. Local residents in developed regions demand local governments to supply higher quality and quantity of BPS, adding up to the scale effects of supplying BPS owing to rapid urbanization and industrialization, so local governments in developed regions have enough finance to supply BPS.

Also, due to their lower rates of urbanization and industrialization and the migration of a large number of surplus labors to developed regions to work (no scale economy of supplying BPS), the governments in developing regions would appear to be busy with economic construction rather than supplying BPS, resulting in the huge gap in BPS of their regions as compared with developed regions. That is, China's inter-provincial equalization level of BPS began to decrease.

Therefore, we will assume that China's inter-provincial equalization level of BPS is a function of the following factors :

$$E_p = f(PGDP, Finance, Prefer, Decen, Transfer, Open, Market, Urban) \quad (10)$$

Where "PGDP" measures inter-provincial differences of economic development, "Finance" is the gap in financial capacity, "Prefer" is differences in local governments' preferences³, differences in local governments' preferences "Decen" is fiscal decentralization degree, "Transfer" is the size of transfer payments, "Open" is the level of opening up, "Market" and "Urban" are marketization and urbanization, respectively.

In order to estimate the function, we use OLS and assume linearity, as in the following:

$$E_p = cons + a_1gdp + a_2finance + a_3prefer + a_4decentr + a_5transfer + a_6open + a_7market + a_8urban + fi + u_i \quad (11)$$

³ It can be measured by the ratio of the expenditure of basic construction with total expenditure of the government. The higher the ratio, proportion to the attention of economic construction, the government may pay more attention to the economic growth, rather than the provision of public service.

Where, α_0 is constant term, α_i captures regional fixed effects, and u_i an error term.

B. Data description

The variables and data sources in the above econometric model are described as follows.

The dependent variable is S_{it} —China's inter-provincial equalization index of BPS, calculated as in equation (8). The indicators selected in this study considered all BPS by combination with stock indicators and flow ones, more objectively and comprehensively. At the same time, the indicators are obtained after being weighted, reflecting the relative importance of different BPS.

Inter-provincial gap of economic development is the ratio of per capita GDP in one province to the average in the nation. If the ratio is greater than 1, it shows that economic development degree in this province is higher than national average; if less than 1, that province is below the national average.

Inter-provincial gap of financial capacity is the ratio of per capita revenue in one province to the average in the nation.

Provincial governments' preference is the ratio of the investment in capital construction to total expenditure in the local budgets.

The degree of fiscal decentralization is the ratio of provincial per capita fiscal expenditure to the one in nation⁴.

The size of transfer payments is the ratio of net per capita transfer payments in one province to the one in the nation.

The level of opening to the outside world is the ratio of total investments of foreign-invested enterprises to per capita GDP in one province.

The level of marketization is the ratio of number of employees employed by state-owned units to total number of employees in one province.

The level of urbanization is the ratio of non-agricultural population to total population in one province

The data comes mainly from "Finance Yearbook of China" and "China Statistical Yearbook" from 1997 to 2007.

Owing to lack of relevant data in Chongqing in 1996, missing data in Chongqing in 1996 were by linear fitting of data from 1997 to 2006. At the same time, sampled data eliminates Tibet for its imperfect data. So there are 30-year samples of 29 provinces in panel data. Table 3 shows the results of descriptive statistics of panel data.

⁴ This variables may can measured by the ratio of non-provincial expenditure at county, community level divided by total expenditures consolidated at provincial level, but I can't find the data.

TABLE 3-DESCRIPTIVE STATISTICS OF PANEL DATA

| variable | Mean | Median | Maximum | Minimum | Std. Dev. |
|--|----------|----------|----------|----------|-----------|
| Provincial equalization index of BPS | 0.282997 | 0.255023 | 0.757622 | 0.084830 | 0.139539 |
| Inter-provincial gap of economic development | 1.121767 | 0.823569 | 4.431607 | 0.335497 | 0.792429 |
| Inter-provincial gap of financial capacity | 0.590021 | 0.355655 | 3.293479 | 0.175730 | 0.633869 |
| Provincial governments' preference | 0.107031 | 0.093033 | 0.295092 | 0.031344 | 0.048288 |
| The degree of fiscal decentralization | 1.259577 | 0.964169 | 5.220658 | 0.517194 | 0.908842 |
| The size of transfer payments | 1.273534 | 1.037453 | 6.996580 | 0.437868 | 0.721578 |
| The level of opening to the outside world | 0.295612 | 0.107373 | 1.749675 | 0.032044 | 0.389794 |
| The level of marketization | 0.159462 | 0.133103 | 0.537298 | 0.054618 | 0.089476 |
| The level of urbanization | 31.88128 | 26.88000 | 85.76000 | 13.87000 | 15.62169 |

Source: Author's calculation.

C. Empirical estimating

To estimate model (11), it is necessary to control for non-observed characteristics of individual and time of units in the panel data estimation. At the same time, by weighted least squares estimation method, the effects of heteroscedasticity are eliminated. This paper makes use of the general least squares estimates (EGLS) to correct for fixed effect or random effect. The results from the LM and Hausman tests indicate that using fixed effects panel estimation is the correct approach to economic analysis. The regression results by software Eviews5.1 can be seen in Table 4.

Model (1) in Table 4 shows regression results when all of the above supply-and-demand factors of BPS are brought into the regression model (11). Based on the regression results of Model (1), we expand it with Model (2) model showing the impacts of location factor by setting up two dummy variables—eastern regions and

TABLE 4-REGRESSION RESULTS OF DETERMINANTS OF CHINA'S INTER-REGIONAL EQUALIZATION OF BPS

| Variable | (1) | (2) | (3) |
|--|-----------------------------|-----------------------------|-----------------------------|
| C | 0.071089 (8.901954)*** | 0.069366 (8.212169)*** | 0.070235 (8.970144)*** |
| Inter-provincial gap of economic development | 0.066332 (7.016698)*** | 0.051825 (4.485683)*** | 0.053593 (4.717903)*** |
| Inter-provincial gap of financial capacity | -0.157503 (-3.210544)*** | -0.14202 (-2.892942)*** | -0.105662 (-5.549391)*** |
| Provincial governments' preference | -0.500252 (-7.479473)*** | -0.482695 (-7.101497)*** | -0.48486 (-7.348168)*** |
| The degree of fiscal decentralization | 0.164165 (4.149853)*** | 0.161611 (4.120417)*** | 0.130451 (11.00952)*** |
| The size of transfer payments | -0.014848 (-0.961859) | -0.01182 (-0.768936) | |
| The level of opening to the outside world | 0.068623 (7.133885)*** | 0.059684 (5.535991)*** | 0.058141 (5.433344)*** |
| The level of marketization | 0.292997 (6.380974)*** | 0.277873 (5.994997)*** | 0.267021 (5.925570)*** |
| The level of urbanization | 0.000913 (2.525643)** | 0.001034 (2.696413)*** | 0.001173 (3.220761)*** |
| Dummy variable-Eastern regions | | 0.017335 (2.088673)** | 0.014675 (2.055068)** |
| Dummy variable-central regions | | 0.004324 -0.715622 | |
| LM test | 6.692121*** | 6.495541*** | 6.566219*** |
| Adjusted R ² | 0.937955 | 0.938595 | 0.938783 |

Source: Author's calculation, The figure in parentheses represents the standard deviation, ***, **, * represent significance level of 1%, 5%, respectively.

central regions⁵. Also based on the regression results for Model (2), Model (3) shows the regression results after removing variables which are not significant. The three econometric models show that most variables are statistically significant at the 0.01 level or higher, while the adjusted R² is over 0.90.

I will mainly interpret the results based on Model (3). From Table 4, it can be found that the inter-provincial gap in economic development, the degree of fiscal decentralization, the level of opening to the outside world, marketization and urbanization, dummy variable-Eastern region

⁵Using traditional trichotomy: Eastern regions includes Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan(11 provinces); Central region includes Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan(8 provinces); Western regions includes Inner Mongolia, Guangxi, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, and other 10 provinces (10 provinces).

are relative positively with China's inter-provincial equalization level of BPS; inter-provincial gap of financial capacity and provincial governments' preference relative negatively with equalization level.

Increasing by 1% the inter-provincial gap of economic development, China's inter-provincial equalization level of BPS will decrease by 0.05%, which shows local economic development is the fundamental base for the development of BPS. Therefore, to implement an equalization strategy of BPS, the gap of China's regional economic development cannot be allowed to expand too large, or the gap of regional economic development will lead to a much gap of regional BPS.

Increasing by 1% of the degree of fiscal decentralization, China's inter-provincial equalization level of BPS will increase by 0.13%, which proves fiscal decentralization in China's helps to promote local supply level of BPS. Therefore, it is quite that incentive effects of fiscal decentralization to local governments have been significant and it forced local governments to enhance and improve local BPS in order to heighten regional competitiveness (Dimitrios Diamantaras, Robert P. Gilles, 1996). By provision of better BPS, local governments may be want to attract more FDI or High-quality workers.

Increasing by 1% of the level of opening to the outside world, China's inter-provincial equalization level of BPS will increase by 0.058%, which illustrates China's opening to the outside world is based on providing high-quality and efficient BPS and direct foreign investment (FDI) forces local governments to supply public goods such as roads, bridges and urban construction, thereby attracting more FDI into the local markets.

Increasing by 1% of the level of marketization, China's inter-provincial equalization level of BPS will increase by 0.267%. The growth of the level of marketization means improving gradually local market environment, and the improvement of BPS is also a key to the market environment perfecting during China's transformation from traditional planned-economy to socialist market economy.

Increasing by 1% the level of urbanization, China's inter-provincial equalization level of BPS will increase by 0.11%. The rise of urbanization rate means the concentration of population and industries and the revealing of scale economies in the supply of BPS. Dummy variable-eastern regions has significantly positively correlation with China's inter-provincial equalization level of BPS, and central regions do not have significant correlation with equalization level of BPS, which reveals that the gap of BPS is mainly the one between eastern regions and central-western regions and that the gap of BPS between central and western regions is not very obvious. At the same time, eastern regions are relatively developed regions in China, therefore it must be noted that as eastern regions strengthen their advantages of BPS by taking advantage of their developed economy in the future, the welfare level of residents in central-western regions is going to lag behind the level in eastern regions. Again, one needs to distinguish between two thing (1) western and central regions can improve their BPS, but (2) the gap between produces can widen if BPS in the eastern provinces increases faster.

Increasing by 1% of inter-provincial gap of financial capacity, China's inter-provincial equalization level of BPS will decrease by 0.105%, which shows that most of China's local finance is spending in government consumption and direct investment and a little of local finance in local BPS. Therefore, the gap of BPS does not reflect the gap of local finance, and many local governments hope to gain more from the central government's fiscal transfer payments to supply local BPS. In general, the more local fiscal revenue, the more input of BPS should be. But over recent years, administrative expenses in many developed regions in China have increased quickly,

which is far higher than the corresponding expenses of BPS. The fact that the preferences of provincial governments are relatively negative with China's inter-provincial equalization level of BPS witnessed provincial governments' preference for developing local economy rather than improving local residents' welfare by supplying more BPS. Therefore, it is urgent for local governments to restructure their function and put supplying BPS into the performance evaluation system of officials.

Model (1) and Model (2) show that the size of transfer payments is not significantly related to inter-provincial equalization level of BPS in China (Kinglun Ngok, 2012). Due to the defects of the current transfer payment system, transfers have not played a role in equalization of regional BPS.

IV. CONCLUSIONS

This article analyzes the developing trends and determinants of inter-regional equalization of BPS in China from 1996 to 2006. The conclusions drawn from the analysis are as follows:

Firstly, based on the developing stages of China's economy and social characteristics, the inter-provincial equalization assessment system of BPS in China must include basic education, public health and basic medical care, public culture, basic scientific research, employment and social security, public infrastructure and environmental protection, and set up different weight coefficients in accordance with their fundamental situation.

Secondly, China's inter-provincial equalization level of BPS from 1996 to 2006 shows a worsening or downward trend. Services that are provided in relatively reasonable degree of equalization are public culture, public infrastructure, ecological services and environmental protection; the must-improve services in terms of equalization degree are employment and social security services, public health and basic medical services; and urgently needed to improve services in the degree of equalization are basic education and basic R&D services.

Thirdly, it can be found that inter-provincial gap of economic development, the degree of fiscal decentralization, the level of opening to the outside world, marketization and urbanization, dummy variable-eastern region are positively related with China's inter-provincial equalization level of BPS; inter-provincial gap of financial capacity and provincial governments' preferences are negatively related with the equalization level. Transfer payments have not played a significant role in equalization of regional BPS so far.

These conclusions have some direct policy implications.

Firstly, the governments should reallocate Public Spending for BPS (Santosh Mehrotra, et al, 1998), focusing on those sub-BPS, which have larger weighting coefficients in the equalization assessment system and are urgent-to-improve services, such as basic education, public health and basic medical care, so that limited finance gains the most efficient results.

Secondly, the inter-provincial gap of economic development positively related with China's inter-provincial equalization level of BPS demands a narrow gap of inter-provincial economic development. Allowing the rational flow of the population, supporting developed regions to developing ones, and setting up aggregation economies in central and western regions would help ensure that the economic gap among regions remains at a reasonable limits.

Thirdly, the degree of fiscal decentralization, the level of opening to the outside world, marketization and urbanization are positively related with related inter-provincial equalization level of BPS in China, which asks the governments to improve the degree of fiscal decentralization, the level of opening to the outside world, and marketization and urbanization in the central and western regions.

Finally, the facts that inter-provincial gap of financial capacity and provincial governments' preferences are negatively related with equalization level, and transfer payments have not played a role in equalization of regional BPS forces. In order to sustainably supply BPS (Deepak Sanan, 2004), it is time for the central government to establish an equitable transfer payment system and should include the BPS in the performance evaluation system of officials at the sub-national level.

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DINAMIČKA EVALUACIJA I ODREDNICE KINESKE INTERREGIONALNE EKVALIZACIJE OSNOVNIH JAVNIH USLUGA

Sažetak: Unatoč tridesetogodišnjim reformama i otvaranju koje je dovelo do brzog ekonomskog razvoja Kine, jaz između osnovnih javnih servisa kao što su osnovno školstvo i zdravstvo se među kineskim provincijama produbio, što je primoralo kinesku vladu da 2005. osmisli strategiju Ekvalizacije osnovnih javnih usluga (BPS). Pomoću ekonometrijske analize, ovaj rad istražuje uzroke opadanja razine regionalne ekvalizacije osnovnih javnih usluga u Kini. Zaključeno je da su razina regionalnih jazova u ekonomskom razvitku, razlike u fiskalnoj decentralizaciji, stupanj otvorenosti vanjskom svijetu i marketizacije te razina urbanizacije znatno pozitivno korelirani s razinom regionalnih osnovnih javnih usluga; istodobno su regionalni disparitet financijskog kapaciteta i vladinih preferencija znatno negativno korelirani s razinom regionalnih osnovnih javnih usluga; ipak, transferna plaćanja centralne vlasti ne igraju ulogu u promociji ekvalizacije osnovnih javnih usluga. Vidi se da bi se u svrhu poboljšanja regionalne ekvalizacije osnovnih javnih usluga u Kini, jaz u ekonomskoj razvijenosti regija trebao kontrolirati unutar racionalnih granica, trebala bi se uspostaviti normativna fiskalna decentralizacija a sustav transfernih plaćanja reformirati s eksplicitnim ciljem ekvalizacije na umu. Istovremeno, centralna vlast bi trebala reformirati trenutni rigidni sustav upravljanja registracijom domaćinstava ili interni sustav putovnica poznat kao *hukou*. Kako bi se osigurao racionalni tok populacije lokalne vlasti bi trebale poboljšati pružanje osnovnih javnih usluga a ne jednostavno oslanjati se na konkurenciju s ciljem regionalnog ekonomskog rasta.

Ključne riječi: Osnovne javne usluge, ekonometrijska analiza, panelni podaci