Empirical Analysis on the Effect of Fiscal Transfer Payment in Guangdong Province and Its Optimization Countermeasures

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Abstract. The fiscal transfer payment system is an effective way to reduce regional financial differences and plays an important role in promoting the equalization of basic services in various regions. Based on the financial transfer payment data of 21 cities in Guangdong Province from 2013 to 2018, this paper first analyzes the basic financial situation of each region, then constructs a fiscal equalization indicator system and uses the coefficient of variation method to study the effect of the transfer payment system on the fiscal improvement of each region, so as to clarify the effectiveness of various transfer payment channels. Finally, provide a reference basis for optimizing the fiscal transfer payment system.

1. Introduction

Since the reform and opening up, China's economy has been developing rapidly, the comprehensive national strength has been continuously strengthened, and the people's living standards have been continuously improved. However, at the same time, due to the geographical location, cultural factors and other factors, there is a certain gap in the level of economic development in different regions. Moreover, due to the influence of the financial system and other factors, the financial resources of local governments at all levels are greatly different.

Therefore, it is necessary to promote the equalization of local financial resources through the financial transfer payment system at the macro level, ensure the implementation of national macroeconomic policies, and gradually narrow the financial gap between regions, so as to promote the equalization of basic public services in various regions, comprehensively improve people's living standards, and achieve the goal of building a moderately prosperous society in an all-round way.

Although the intergovernmental financial transfer payment system is constantly improved in practice, there are still some problems in the implementation process, such as insufficient scale, unreasonable structure, low proportion of general transfer payment, irregular use of transfer payment funds, and lack of effective supervision. Therefore, it is of great theoretical and practical significance to carry out the research on the intergovernmental fiscal transfer payment system, analyze its function mechanism, effectiveness and existing problems, and learn from the successful experience of foreign countries to improve China's intergovernmental financial transfer payment system.

2. Analysis of Research Status

At present, the research on Fiscal Equalization mainly focuses on several aspects. The first is the utility analysis of intergovernmental fiscal transfer payment. For example, Qiang Zhou, Chen Jiandong, Jia Zhenzhen and others use panel data to study the effect of inter provincial transfer payment. It is found that transfer payment is conducive to narrowing the regional gap, but this effect is not stable and will be affected by many factors at the same time [1-3]. Secondly, the research on the
existing problems of intergovernmental financial transfer payment. The research of Liu Mei and Liang Siqi shows that the main problems in China's transfer payment system are: the division of administrative power and financial power is not clear, and the responsibility confirmation is relatively vague; the types of special transfer payment are too many; the classification of special transfer payment subjects is not clear; and the policy supporting burden It causes some problems such as waste of funds.\textsuperscript{[4,5]} The third is about the research on the improvement of fiscal transfer payment measures. By studying the successful modes of foreign financial transfer payment and combining with the actual situation of our country, Wang Hao and Li Xiaoping proposed to strengthen the financial legislation and formulate the financial transfer payment law, clarify the administrative and financial rights of governments at all levels, scientifically define the transfer payment standards, and strengthen the supervision of transfer payment funds And management\textsuperscript{[6,7]}.

Guangdong Province is the largest economic province in China. With the rapid development of economy, there is a big gap in the financial level among the cities, especially the gap between the Pearl River Delta and the three regions of East, West and northwest of Guangdong Province. Therefore, in order to realize the coordinated development among regions, it is necessary to study deeply and reasonably arrange the limited transfer payment funds. The Department of finance of Guangdong Province has taken the lead in carrying out the research on the performance evaluation of general transfer payment funds in China, and has achieved good results. Based on the existing scholars' research, this paper compares the transfer payment effect of 21 cities in Guangdong Province by using the coefficient of variation method, analyzes the effectiveness of the three transfer payment methods, and then puts forward targeted optimization measures.

3. Research Methods
To analyze the use effect of transfer payment funds, the common measurement method is to use the comparison of per capita financial resources before and after transfer payment to reflect the effect of fiscal equalization of transfer payment. This method is the most simple and feasible. In order to make the comparison before and after, we use the coefficient of variation method.

The coefficient of variation is a statistic to measure the variation degree of each observation value in the index. When comparing the variation degree of two or more indicators, if the unit of measurement is the same as the average, the standard deviation can be directly used for comparison. If the unit and mean are different, the standard deviation cannot be used to compare the degree of variation, but the ratio of standard deviation to average should be used. The ratio of standard deviation to average is called coefficient of variation, which can eliminate the influence of unit and average on the comparison of variation degree of two or more indexes.

(1) The coefficient of variation of financial resources before transfer payment:

\[ cv_1 = \frac{v_1}{x}, \text{ where } v_1 = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{\sum_{i=1}^{n} p_i}} \]  \hspace{1cm} (1)\]

\( x_i \) is the per capita financial income of the \( i \) th city before the transfer payment; \( p_i \) is the population proportion coefficient of the \( i \) th city; \( \bar{x} \) is the per capita financial income of all cities.

(2) The coefficient of variation of financial resources after transfer payment is:

\[ cv_2 = \frac{v_2}{y}, \text{ where } v_2 = \sqrt{\frac{\sum_{i=1}^{n} (y_i - \bar{y})^2}{\sum_{i=1}^{n} p_i}} \]  \hspace{1cm} (2)\]

\( y_i \) is the per capita financial income of the \( i \) th city after the transfer payment; \( p_i \) is the
population proportion coefficient of the $i$th city; $\bar{Y}$ is the per capita financial income of all cities.

Finally, according to the first two formulas, the effect coefficient of transfer payment equalization is calculated:

$$TE = \frac{(CV_1 - CV_2)}{CV_1}$$  \hspace{1cm} (3)

If the coefficient is positive, it indicates that the transfer payment within the region has indeed narrowed the financial gap between regions, and the larger the coefficient, the better, because the larger the coefficient is, the better the equalization effect of transfer payment is; if the coefficient is negative, it indicates that transfer payment has not played a role in narrowing the gap, but has widened the financial gap between regions [8,9].

4. Empirical Analysis

4.1. Data Collection

According to the calculation principle of coefficient of variation, the data of five indicators including regional financial revenue, population, return transfer payment, general transfer payment and special transfer payment are involved. The data of each index from 2013 to 2018 is collected from the statistical yearbook and financial yearbook of Guangdong Province.

4.2. Analysis on the Structure of Fiscal Transfer Payment in Guangdong Province

In order to better understand the overall change trend of transfer payment, we calculated the total amount of transfer payment and the proportion of single transfer payment from 2008 to 2018, as shown in Table 1, and then generated the total amount of transfer payment and the proportion of single transfer payment into Figure 1 and Figure 2.

Table 1. Overall and composition of transfer payments from 2008 to 2018.

| year | Total value of transfer payment | Tax return transfer payment | Proportion of tax return transfer payment | General transfer payment | Proportion of general transfer payment | Special transfer payment | Proportion of special transfer payment |
|------|--------------------------------|-----------------------------|------------------------------------------|--------------------------|----------------------------------------|--------------------------|----------------------------------------|
| 2008 | 849.58                         | 265.41                      | 0.31                                     | 234.72                   | 0.28                                   | 349.44                   | 0.41                                   |
| 2009 | 990.62                         | 255.72                      | 0.26                                     | 259.3                    | 0.26                                   | 475.6                    | 0.48                                   |
| 2010 | 1211.04                        | 316.09                      | 0.26                                     | 301.07                   | 0.25                                   | 593.87                   | 0.49                                   |
| 2011 | 1656.24                        | 455.6                       | 0.28                                     | 412.49                   | 0.25                                   | 788.15                   | 0.48                                   |
| 2012 | 1847.03                        | 459.62                      | 0.25                                     | 498.20                   | 0.27                                   | 889.24                   | 0.48                                   |
| 2013 | 2417.79                        | 756.86                      | 0.31                                     | 1040.24                  | 0.43                                   | 620.69                   | 0.26                                   |
| 2014 | 2738.89                        | 608.57                      | 0.22                                     | 1403.49                  | 0.51                                   | 726.83                   | 0.27                                   |
| 2015 | 2359.17                        | 604.98                      | 0.26                                     | 963.27                   | 0.41                                   | 790.92                   | 0.34                                   |
| 2016 | 1951.37                        | 524.58                      | 0.27                                     | 941.50                   | 0.48                                   | 485.30                   | 0.25                                   |
| 2017 | 2646.21                        | 702.35                      | 0.27                                     | 1436.44                  | 0.54                                   | 507.42                   | 0.19                                   |
| 2018 | 2970.59                        | 724.35                      | 0.24                                     | 1635.74                  | 0.55                                   | 610.50                   | 0.21                                   |
As shown in Figure 1, it can be seen that the total amount of transfer payments in Guangdong Province between 2008 and 2018 maintained a rapid growth, from 87.958 billion yuan in 2008 to 273.889 billion yuan in 2014, an increase of nearly 200 billion yuan. It shows that the scale of payment transfer payments has continued to increase, with a decline in 2015 and 2016, but has resumed rapid growth since 2017. In 2018, the scale of transfer payments reached a new high of 297.59 billion yuan.

From the perspective of the changes in the proportions of the three transfer payments, from 2008 to 2012, the proportion of special transfer payments increased slowly, while the proportion of tax returns and general transfer payments decreased slightly; however, since 2013, the proportion of general transfer payments The proportion increased rapidly from 27% to 43%. Correspondingly, the proportion of special transfer payments decreased from 48% to 26%. The proportions of the two were almost interchangeable, while the proportion of tax return transfer payments maintained a slow downward trend.

On the whole, the transfer payment structure of Guangdong Province is gradually changing to a more optimized direction. One of the important marks is that the proportion of general transfer payment is increasing. This change has a great impact on the fiscal equalization of various regions.

4.3. Analysis of the Overall Equalization Effect of Transfer Payment

In the following, we will use the coefficient of variation method to analyze the financial balance of cities in Guangdong Province. We will judge the equalization effect of transfer payment according to the change of per capita financial resources of each city in Guangdong Province before and after the transfer payment, and further judge the advantages and disadvantages of equalization effect according to the equalization effect coefficient calculated by the formula. The following will analyze the overall equalization effect of transfer payment.

According to the formula of difference coefficient method, combined with the statistical data of 2013-2018, the coefficient of variation and equalization effect coefficient of transfer payment in Guangdong Province from 2013 to 2018 are calculated, as shown in Table 2.

| Year | CV₁  | CV₂  | TE  |
|------|------|------|-----|
| 2013 | 0.88 | 0.77 | 0.12|
| 2014 | 0.91 | 0.77 | 0.15|
From an overall point of view, the data in the second column of Table 2 shows that: before the transfer payment, the financial gap between the cities in Guangdong Province was large, and the coefficient of variation was basically stable at around 1, which indicating that before the transfer payment, the difference between the cities was relatively stable. Looking at it in stages, the financial gap between cities from 2013 to 2016 has gradually increased, and then the gap has gradually narrowed from 2016 to 2018, but the decline is not obvious.

Secondly, by observing the data in the third column of Table 2, comparing with the value before the transfer payment, it can be found that the coefficient of variation after the transfer payment has indeed been reduced, which means that the financial gap between cities has been reduced. Specific to the coefficient of each year, it can be seen that the peak value decreased from 0.80 in 2015 to 0.56 in 2018, which is a significant decrease.

In order to compare the variation of coefficient of variation before and after transfer payment more intuitively, the table data is converted into Figure 3. It can be seen from the figure that the CV2 curve is always below the CV1 curve, which indicating that the coefficient of variation after the transfer payment is always less than that before the transfer payment, which further indicates that the transfer payment indeed reduces the financial gap between cities. In addition, it can be seen from the distance between the two curves in the figure that the distance between the two has been enlarging from 2013 to 2018, which shows that with the optimization of transfer payment structure in the whole province, the effect of transfer payment is gradually enhanced, and the effect of transfer payment in playing an equalization role will be more reasonable.

Finally, according to the value of TE in the table, we can see that the coefficient TE is always positive from 2013 to 2018, which indicates that the transfer payment has indeed played an equalization role and is conducive to reducing the financial differences among cities in Guangdong Province.
Province. From the average value of TE, the average value of TE coefficient in six years is 0.24, which indicates that the overall effect of equalization is not very obvious. However, from another perspective, the value of TE from 2013 to 2018 shows a rapid upward trend, which means that the equalization effect of transfer payment is increasing.

5. Conclusion
This paper makes an in-depth study on the fiscal transfer payment effect of 21 cities in Guangdong Province from 2013 to 2018, and finds that the general transfer payment has the most obvious effect on improving the regional fiscal equalization effect, and Guangdong Province has greatly increased the proportion of general transfer payment since 2013, which directly proves this point. Of course, in order to improve the financial balance between the Pearl River Delta of Guangdong Province and the East, the northwest of Guangdong Province, in addition to increasing the proportion of general transfer payment and reducing the proportion of tax return transfer payment, it is also necessary to continue to tilt to the East and northwest of Guangdong Province in terms of scale and absolute quantity. At the same time, it is necessary to standardize the use process of special transfer payment funds, so as to better play the equalization of transfer payments effect.

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