

A Research on the Fiscal Regional Difference of China's Prefecture-Level Administrative Regions

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Abstract

As a centralized state power, China intervenes in local economy through effective fiscal and administrative measures. Local finances play a significant role in Chinese governmental activities, providing financial support in various fields, such as infrastructure, education and culture. Local finance is also a mirror of local economics. Local fiscal revenues and economic conditions influence each other, interacting as both cause and effect. Some experts in geoeconomics have studied regional economic disparities through spatial variations of GDP. This paper, however, considers it more profound and multilevel to study the development of local economy from the perspective of fiscal revenues in the context of Chinese governmental interventions. This paper originally offers specific and concrete details of local fiscal revenues by calculating differences of spatial distribution of nominal and disposal fiscal revenues, providing new explanations for the controversial issue on whether regional economic disparities are expanding or not.

Keywords

Prefecture-Level Administrative Region, Fiscal Revenue, Spatial Disparity

1. Introduction

Since the tax reform in 1999, China's fiscal policy has been under the tax-sharing system, resulting in the disposable income of local governments declining substantially. Local fiscal revenues mainly come from central government's fiscal transfers, various subsidies and land finance. In order to figure out the process, tendency and mechanism of China's regional economic development and tell the difference between governmental and economic influence on local fiscal reve-

nue, this paper conducts difference analysis and spatial analysis of detailed fiscal data from about 333 prefecture-level administrative districts of 1999, 2000, 2002, 2003 and 2009 across the nation¹.

Regional difference has always been an important issue for geographers, economists and government regulators. Since the reform and opening up, China's economic achievements has been globally acknowledged. However, regional gaps emerge as an inevitable problem at the same time, existing among the east, middle, and west region of China, and between different provinces and even different areas within provinces. Although a series of national policies on regional economic coordination have been implemented since 2000, such as *Western Development*, *Revitalization of Old Industrial Bases in Northeast China* and *Rise of Central China*, the problem of regional disparities remains. Long-term stable growth of national economy and social harmony are largely restricted by the regional discordance of economic development. Fiscal capacity to some extent reflects local economic strength, for smaller economy leads to weak fiscal strength, making it hard to make ends meet. So when comparing regional economic differences, it will be more convincing to measure it from the disparities of fiscal revenue.

2. Review of the Literature

In recent years, experts have done a lot of researches in regional fiscal disparities. Relevant studies started from 1999 in China, and earlier in international academia.

2.1. International Research on Disparities of Fiscal Revenue

Wide disparity of fiscal strength among regions is a common problem faced by nations of transitional economies. According to McLure's analysis (1994) on distribution of taxing power and fiscal federalism in Russia, wide disparities of fiscal strength exist among regions in Russia, which mainly result from unbalanced distribution of natural resources [1]. After relevant studies of several countries, such as Brazil, India, Russia and Switzerland, Prudhome (1995) finds out that inappropriate fiscal decentralization might gather resources in only a few areas [2]. By comparing government financial conditions of Brazil and China, Kee (2003) offers political suggestions on how to balance fiscal disparities among governments of different regions [3]. With intense research on fiscal disparity between countries in the Southeast Asia and China, Hofinan and Gurra (2004) discover that internal regional fiscal disparities of China, Indonesia, Philippines and Vietnam remain still quite wide, although the system of transfer payments can to some extent stabilize and compensate such disparities [4].

2.2. Research on Disparities of Fiscal Revenue in China

Since 1999, researches on China's regional fiscal revenue by experts have fully

¹<http://data.stats.gov.cn/easyquery.htm?cn=C01>.

revealed the noticeable disparities of fiscal revenue among regions in China. Some scholars hold that the disparities mainly exist among provinces within the East China and between the East and Midwest China, and point out that the difference of business tax and consumption tax serves as the major contributor to the disparity of regional fiscal strength (Tang and Zong, 2003; Hu and Liu, 2011) [5] [6]. According to the study on economic development and fiscal revenue of China's three major zones between 1979 and 1998, Zhu Guangping (2000) finds that the growth of fiscal revenue in the East is slower than the Midwest China though the economic growth in the East is faster [7]. Tan Taiqian (2004) discovers the remarkable disparities of regional fiscal revenue among twelve cities in western provinces of China. For Middle China [8], Li Mingxian and others (2008) further structurally explain that differences of fiscal strength within groups are much wider than that between groups with different regions grouped according to industrial structure, GDP per capita or urbanization [9]. Wang Xiaorun (2009) thinks that for the whole country, provincial disparities of revenue arise mainly from disparities among the East, Middle and West China [10].

Using Gini coefficient, coefficient of variation and standard deviation coefficient as indicators, many scholars have studied on whether transfer payments have narrowed disparities of regional fiscal revenue. No agreement is yet reached on the developing tendency of the disparities of regional fiscal revenue in China. Some scholars believe that the disparities keep increasing (Tsui, 2005; Liu and others. 2006; Yin and others. 2010) [11] [12] [13], while others take the opposite view, maintaining that China's disparities of regional fiscal revenue have a certain tendency of narrowing (Ma Xiao and others, 2012) [14]. With empirical studies, no reliable conclusion is yet agreed on the equalization of disparities of regional fiscal revenue brought by central transfer payments. Zeng Junping (2000) argues that transfer payments from central to local governments have widened the gap of per capita fiscal revenue among regions [15]. Liu Rongcang and Jiao Guohua (2002) and Dabla-Norris (2005) hold the view that there are no obvious changes in disparities of fiscal strength among regions after transfer payments [16] [17]. Using the coefficient of variation, Liu Liang (2007) measures the inequality and concludes that the disparities of per capita fiscal revenue among regions have been narrowed to some extent after central transfer payments [18]. Although transfer payments have narrowed the disparities of fiscal strength among provinces and the three major areas of China, Cao Junwen and Luo Liangqing (2006) think that the transfers have also expanded the internal gap of fiscal strength within the Middle and West China [19]. Jiang Qing (2007) has drawn a similar conclusion, suggesting that in terms of county finances, transfer payments have in fact widened their disparities [20].

With regard to research methods of spatial difference, descriptive statistical methods like Gini coefficient, coefficient of variation and extremum are frequently adopted [21] [22] [23]. In the use of data, most scholars in China adopt GDP per capita [24] [25], some make use of disposable personal income [26] and very few experts choose fiscal revenue as data [23] [27]. However, fiscal

revenue of local government is a system defined subjectively, generating many ambiguous definitions politically. And in previous studies, actual fiscal revenue is simply replaced by fiscal budget revenue, which confuses its definition and overlooks its colorful connotations. This also serves as a major reason why researches into disparities of fiscal revenue remain inconclusive. Therefore, this paper selects detailed fiscal revenue data of prefecture-level cities meticulously, and distinguishes between local fiscal revenue and external transfer payments. The results of the paper might bring new inspirations on the debatable issue in the academia.

3. Innovative Distinction between Disposable Fiscal Revenue and Actual Fiscal Revenue

First of all, few researches on disparities of regional development are based on fiscal revenue. In existing related studies, few of them take actual fiscal revenue, or even complete fiscal revenue into account. Less rigorous data will lead to less reliable outcomes. The author believes that we can analyze the development of local government in accordance with the fiscal revenue only if we have obtained actual data.

In consideration of China's special conditions, Chinese government generally only publishes budget sheets instead of detailed tables of final fiscal accounts. Since budget sheets certainly serve as a strong constraint on government's consumption and investment, the deviation between final revenue and budget revenue is less than 10% for most local governments. Given the unavailability of detailed data of final accounts, the author considers it feasible to use budget revenue alternatively. This paper originally defines local fiscal revenue as two types—disposable fiscal revenue and actual fiscal revenue (**Table 1**).

The actual fiscal revenue, the most authentic fiscal revenue in author's opinion, reflects fiscal capacity of local governments, which equals the sum of the annual budget revenue for general purposes and revenue of funds of local governments, revenue of extrabudgetary special financial accounts and last year's surplus minus transferred money, transfer payments and subsidies of all kinds.

Table 1. Two calibers of government's fiscal budgetary revenue.

Size of the Caliber	Name of the Caliber	Computing Methods
Large	Disposable	=(Subnational Government's Budget Revenue for General Purposes + Subnational Government's Revenue of Funds + Extrabudgetary Revenue of Special Fiscal Accounts) – (Transferred Money – Last Year's Surplus)
	Actual	=(Subnational Government's Budget Revenue for General Purposes + Subnational Government's Revenue of Funds + Extrabudgetary Revenue of Special Fiscal Accounts) – (Transferred Money – Last Year's Surplus) – Transfer Payments and Subsidies of All Kinds

Data sources: calculated by data from *National Financial Statistics of Prefectures, Counties and Municipalities* in 1999, 2000, 2002, 2003, 2008 and 2009.

Disposable fiscal revenue is at subordinate level, which equals actual fiscal revenue plus various transfer payments and subsidies offered by superior governments, equivalent to government's net inflow that very year. A portion of the revenue is earned by oneself, with the rest part allocated by the superior government.

4. Data Source and Research Methods

4.1. Data Source

Data of this paper are mainly from *Fiscal Statistics of Cities and Counties in China* and *China Statistical Yearbook for Regional Economy*. Taking availability, completeness and reliability into consideration, we select data of 6 years from *Fiscal Statistics of Cities and Counties in China* including 1999, 2000, 2002, 2003, 2008 and 2009, and data from *China Statistical Yearbook for Regional Economy* of 2000, 2001, 2003, 2004, 2009 and 2010. It takes more than two months in manual data entry, achieving 921,600 records. The reliability and completeness of data have been assured maximumly through the demanding work.

4.2. Research Method

This paper adopts Theil index which is able to decompose differences in the study. Theil index, also called Theil's entropy measure, was named after Theil (Theil, 1967), who used the concept of entropy in information theory to calculate revenue inequalities. It is frequently used to measure the degree of inequality, which indicates the revenue gap among individuals or regions. There are two types of Theil index, Theil's T and Theil's L. This paper adopts the former one, which is more common:

$$T = \sum (Y_i/Y) * \log((Y_i/Y)/(P_i/P))$$

Y_i denotes revenue in region i and Y denotes the total revenue of all regions;
 P_i denotes population in region i and P denotes the total population of all regions.

Theil's L is an extension of Theil's T, but less prevalent:

$$L = \sum (P_i/P) * \log((Y_i/Y)/(P_i/P))$$

Y_i denotes revenue in region i and Y denotes the total revenue of all regions;
 P_i denotes population in region i and P denotes the total population of all regions.

Theil's T is weighted by the proportion of regional population to the total population.

The values of Theil's T range from 0 to 1. The larger number suggests wider regional disparities, indicating less balanced development among regions. By comparison with Gini coefficient, Theil's index is more sensitive to greater changes in income level. It can also decompose the differences into ones within

and among groups, which helps to further analyze reasons on disparities of fiscal revenue among prefecture-level administrative units.

The decomposition of Theil's index:

$$T = T_{\text{within groups}} + T_{\text{among groups}}$$

$$T_{\text{among groups}} = \sum (Y_j/Y) * \log((Y_j/Y)/(P_j/P))$$

$$T_{\text{within groups}} = \sum (Y_j/Y) * \sum (Y_{ij}/Y_j) * \log[(Y_{ij}/Y_j)/(P_{ij}/P_j)]$$

Y_{ij} denotes the revenue of region j in group i , Y_j denotes the total revenue of regions in group j , and Y denotes the total revenue of all regions.

P_{ij} denotes the population of region j in group i , P_j denotes the total population of regions in group j , and P denotes the total population of all regions.

This paper uses fiscal data of China's prefecture-level administrative districts, therefore, we are able to investigate differences within each province and across the country.

5. The Basic Situation of Local Finances and Differences of Fiscal Revenue

5.1. The Basic Situation of Local Finances

This paper calculates disposable fiscal revenue per capita and actual fiscal revenue per capita according to the population of every prefecture-level cities in that very year. According to **Figures 1-6**, the annual disposable fiscal revenue per capita does not strictly follow the pattern, which is high in the east and low in the west. On the contrary, the data become high in the northwest and low in the southeast. After removing transfers and subsidies of all kinds, it is found that the distribution of actual fiscal revenue per capita become more acceptable. In developed coastal areas, the actual fiscal revenue per capita is quite high. However, in Inner Mongolia and Xinjiang, it is still on the high side. The paper considers

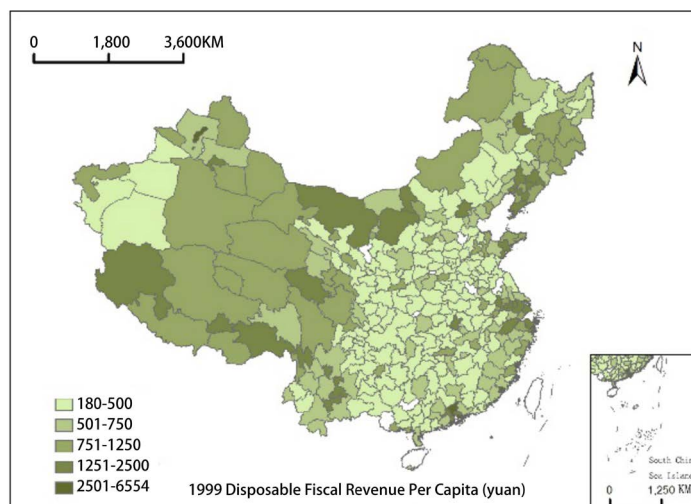


Figure 1. Disposable fiscal revenue per capita of prefecture-level cities in China in 1999.

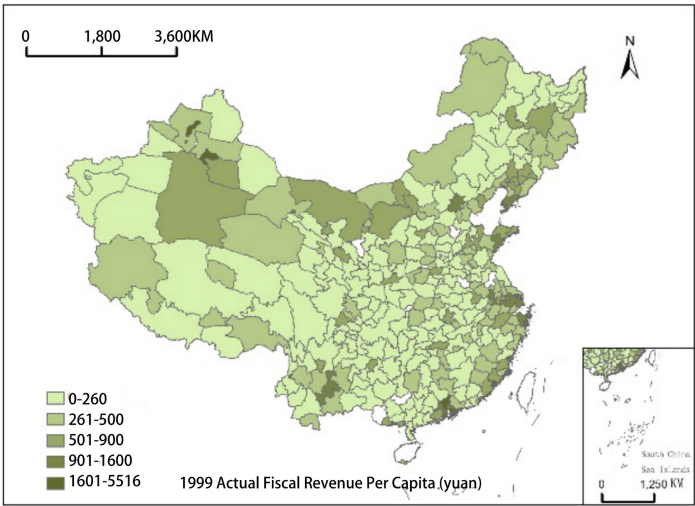


Figure 2. Actual fiscal revenue per capita of prefecture-level cities in China in 1999.

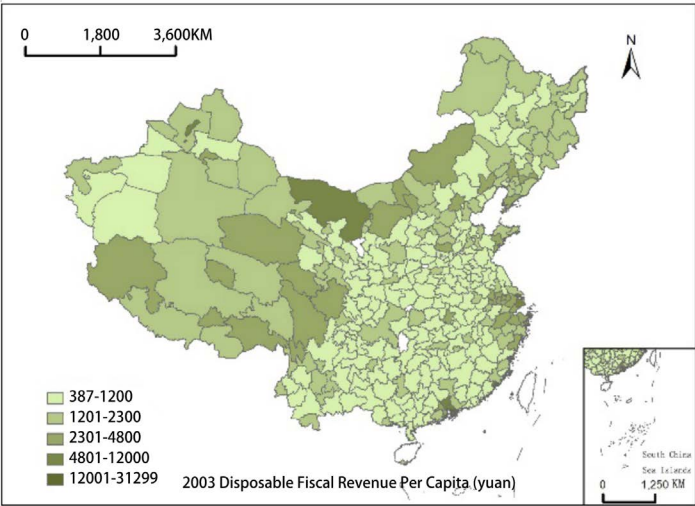


Figure 3. Disposable fiscal revenue per capita of prefecture-level cities in China in 2003.

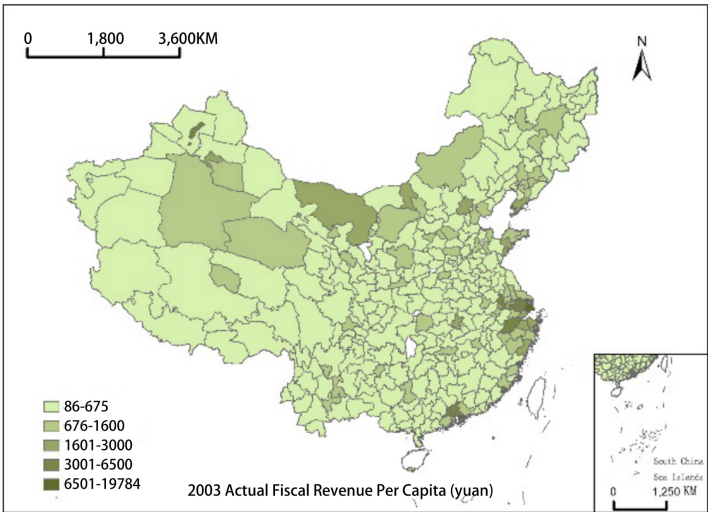


Figure 4. Actual Fiscal revenue per capita of prefecture-level cities in China in 2003.

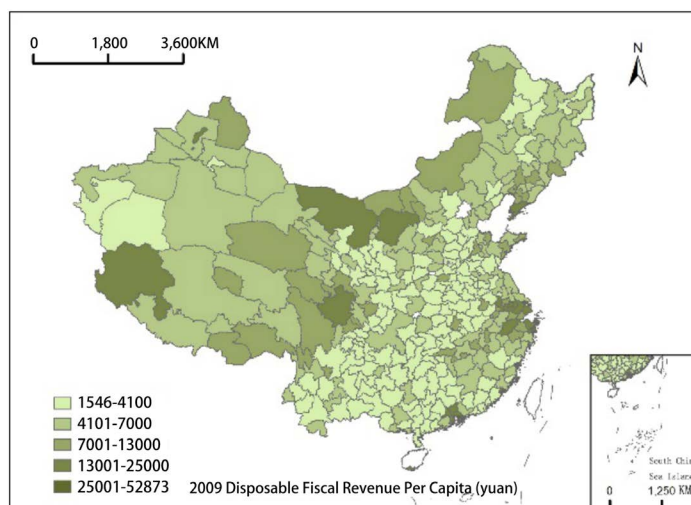


Figure 5. Disposable fiscal revenue per capita of prefecture-level cities in China in 2009.

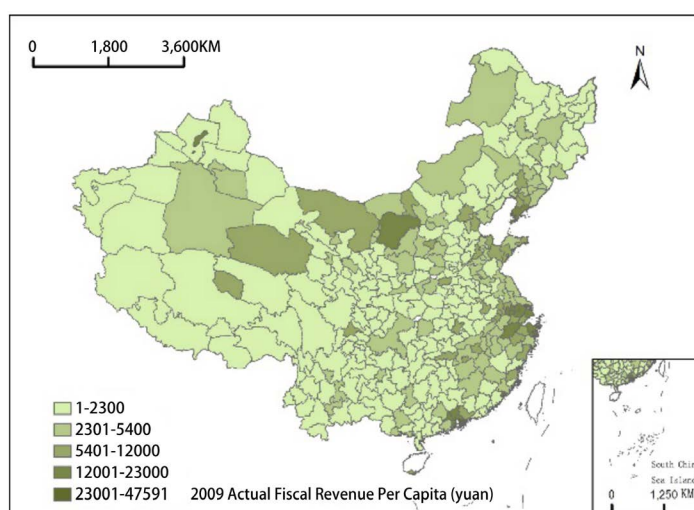


Figure 6. Actual fiscal revenue per capita of prefecture-level cities in China in 2009. Data sources of **Figures 1-6**: calculated by author of this study.

two reasons. First, sparse populations of Inner Mongolia and Xinjiang lead to higher average fiscal revenues. Second, some prefecture-level cities in two provinces have rich mineral resources, which contributes to higher average fiscal revenues.

5.2. Differences and Tendencies of Fiscal Revenue within Provinces

In terms of each province, we apply Theil's T to disposable fiscal revenue and actual fiscal revenue of 1999, 2000, 2002, 2003 and 2009 to calculate disparities of fiscal revenue within each province. The text only displays figures of 1999, 2003 and 2009 for lack of space.

In **Figure 7**, figures in the left column display Theil indexes, calculated through disposable fiscal revenues of each province in the corresponding years.

The middle column displays Theil indexes, calculated through actual fiscal revenues of each province in the corresponding years, and the larger the number, the darker the color will be. Then the right column presents Theil indexes after expurgating fiscal transfers and subsidies. The white points at larger Theil index after expurgating fiscal transfers and subsidies; the dark grey points at smaller after expurgating fiscal transfers and subsidies. Theil index and the light grey represents invariant Theil index.

Generally, it can be seen that if we focus solely on the left column which shows Theil indexes of disposable fiscal revenues of each province, the overall colour becomes lighter and Theil index decreases from 1999 to 2009, implying that the disparities of fiscal revenue within each province decline year by year. The tendency appears to be quite the opposite if we focus solely on the middle column, which shows Theil indexes of actual fiscal revenues of each province from 1999 to 2009. The colour grows darker, the Theil index becomes larger, and the disparities of fiscal revenue within each province increase year by year. Then focusing on the right column where fiscal transfers and subsidies have been

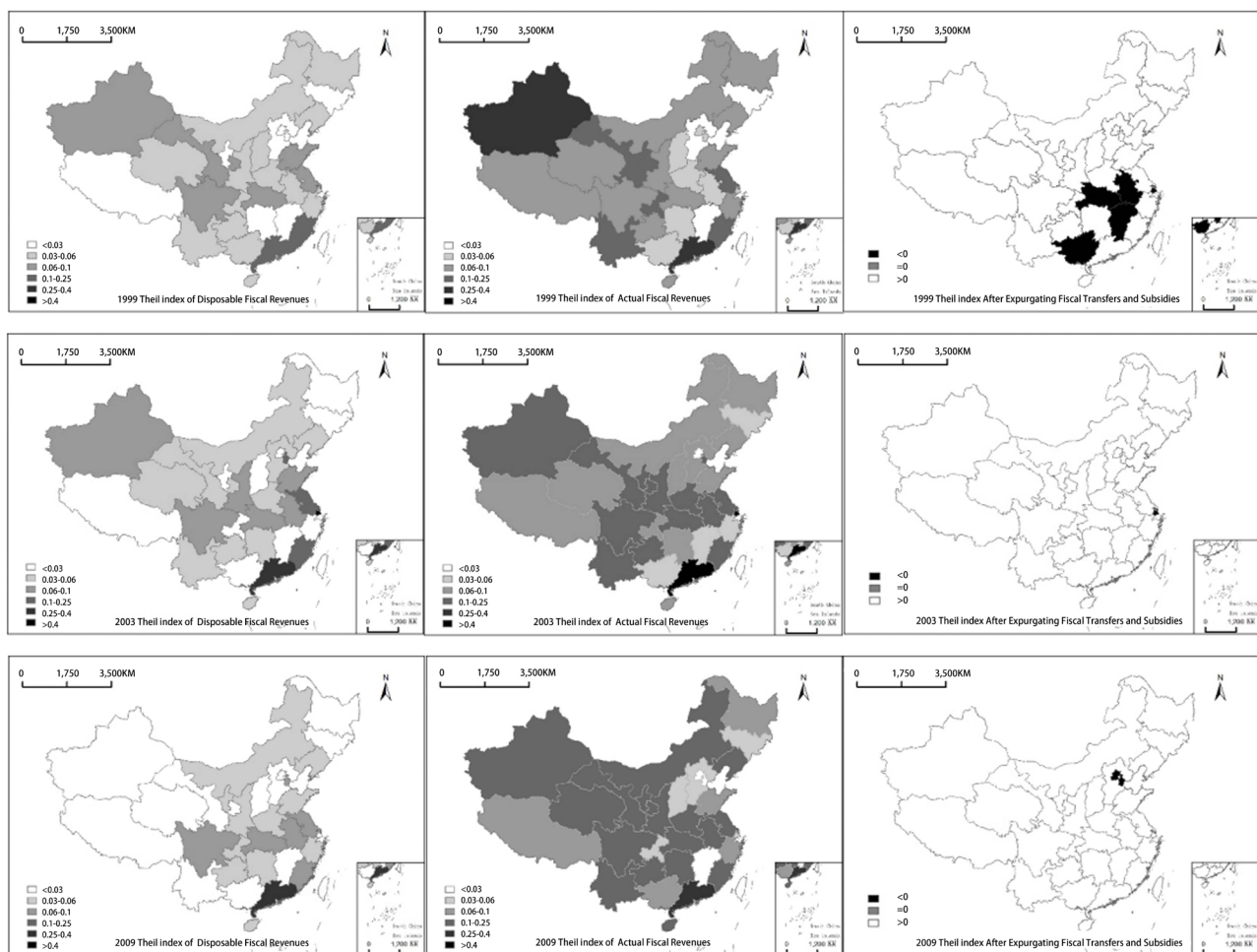


Figure 7. Disparities between disposable and actual fiscal revenues in each province in 1999, 2003 and 2009. Data sources: calculated by author of this study.

expurgated, it is discernible that most of the provincial parts are white, indicating widening disparities of fiscal revenue within each province. Only a minority of provinces witness declining disparities of fiscal revenue, which are Hubei, Anhui, Jiangxi and Guangxi in 1999, Shanghai in 2003, and Beijing and Tianjin in 2009. These are all provincial administrative regions in East and Mid-China. The conclusions drawn from **Figure 7** are as follows:

Conclusion 1. The government's transfers and subsidies effectively reduce the imbalance of fiscal revenue in most provinces in China, especially some less developed provinces in the western and central regions. Although the Theil indexes of developed provinces in the eastern and a few central developed provinces increase slightly, they exert little influence on the overall trend.

Conclusion 2. The government's instructions about transfers and subsidies seem to be optimized continuously, because the number of the provinces whose Theil indexes rise after accepting transfers and subsidies is on the decrease from 1999 to 2009.

Conclusion 3. Over the decade from 1999 to 2009, the disparities of disposable fiscal revenue within each province keep decreasing, owing to the state effective transfer payments and subsidies. Irrespective of these factors, the disparities of actual fiscal revenue within provinces rise year by year. Although transfer payments and subsidies have effective impacts on balancing disposable capital across local governments, they have not cultivated the independence of each province on addressing problems, resulting in widening disparities of actual fiscal revenue within provinces. This also fully testifies that the experts have no agreement on whether disparities of fiscal revenue tend to increase or decrease, possibly due to different statistical calibers.

5.3. The Decomposition of Disparities of National Fiscal Revenue

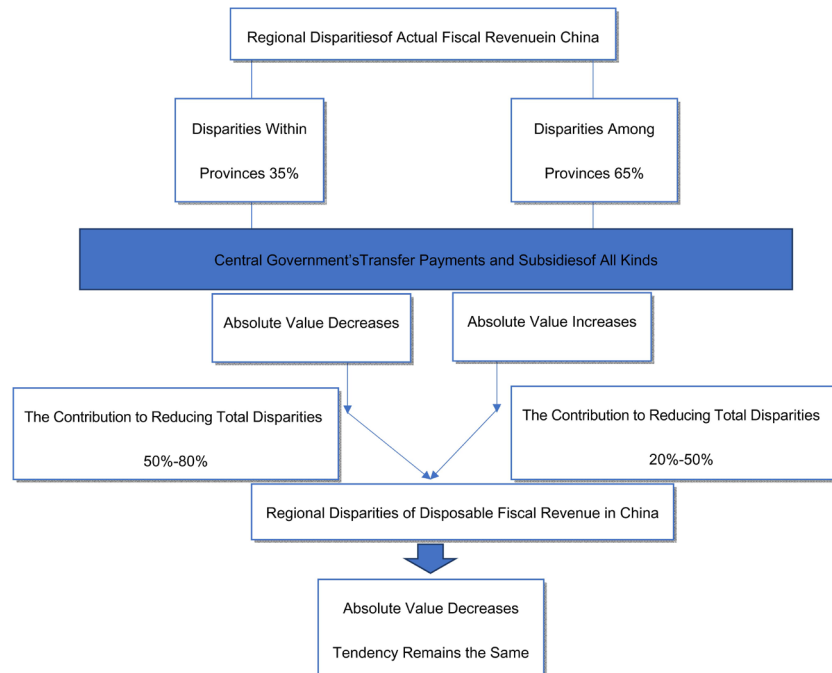
According to the decomposability of Theil index, we decompose annual Theil index into contributions within and among provinces. The outcomes are presented in **Table 2** and **Figure 8**. As for the whole country, national disparities of both disposable and actual fiscal revenues increase year by year, with different growth rates.

Transfer payments and subsidies from the superior authority are regulated in the way showed in **Figure 8**. In the disparities of actual fiscal revenue among prefecture-level administrative regions, around 65% derive from disparities among provinces, and about 35% derive from disparities within provinces. The absolute values of disparities among and within provinces decrease under the implementation of various transfer payments and subsidies. However, the widening trend of the disparities among provinces remains stable, while the disparities within provinces become smaller. In this process, the government's transfer payments and subsidies have greater influence on decreasing disparities within provinces, which eventually decrease the absolute value of disparities of national fiscal revenue. However, the generally widening trend of disparities of national fiscal revenue fails to be reversed.

Table 2. Decompositions and variations of Theil indexes of different statistical calibers in 1999, 2000, 2001, 2002, 2003 and 2009.

Historical Decompositions and Variations of Theil Index											
Time		Decomposition Of Theil index In 1999		Decomposition Of Theil index In 2000		Decomposition Of Theil index In 2002		Decomposition Of Theil index In 2003		Decomposition Of Theil index In 2009	
Different Statistical Calibers	Decomposition	Absolute Value	Contribution Rate	Absolute Value	Contribution Rate	Absolute Value	Contribution Rate	Absolute Value	Contribution Rate	Absolute Value	Contribution Rate
Including Transfer Payments	Disparities Among Provinces	0.046	39.00%	0.055	37.75%	0.056	39.14%	0.096	44.31%	0.047	40.85%
	Disparities within Provinces	0.073	61.00%	0.091	62.25%	0.087	60.86%	0.121	55.69%	0.068	59.15%
	Total Disparity	0.119	100%	0.147	100%	0.143	100%	0.216	100%	0.115	100%
Without Transfer Payments	Disparities Among Provinces	0.055	32.42%	0.068	32.03%	0.087	37.20%	0.129	42.20%	0.100	43.25%
	Disparities within Provinces	0.114	67.58%	0.144	67.97%	0.147	62.80%	0.176	57.80%	0.131	56.75%
	Total Disparity	0.169	100%	0.211	100%	0.233	100%	0.305	100%	0.230	100%
Variation After Expurgating Subsidies	Variations of Disparities Among Provinces	0.008		0.012		0.031		0.033		0.053	
	Variations of Disparities within Provinces	0.042		0.052		0.060		0.056		0.063	
	Total Variation of Disparities	0.050		0.065		0.090		0.089		0.116	

Data sources: calculated by author of this study.

**Figure 8.** The mechanism of fiscal regulation. Data sources: calculated by author of this study.

6. Conclusions

This paper elaborately explores the changes of disparities of fiscal revenue at local administrative and provincial levels in China and how they are influenced by the central government's transfers and subsidies of all kinds, mainly through the calculation and decomposition of Theil index. The results are as follows.

1) According to the calculations, from 1999 to 2009, disparities of actual fiscal revenue across prefecture-level administrative regions continue to expand, which are reflected in a sustained growth of Theil index correspondingly. Approximately, disparities among provinces account for 65%, while disparities within provinces take up the rest 35%. Disparities among provinces will contribute more to the total disparity over time.

2) Taking the disposable fiscal revenue at the local level as an indicator, disparities of fiscal revenue across prefecture-level administrative regions in China gradually diminish, accompanied with a decreasing Theil index. Approximately, disparities among provinces account for 40%, while disparities within provinces take up the remaining 60%. Disparities among provinces will contribute more to the total disparity over time.

3) In the same year, with comparison to the Theil indexes measured by actual and disposable fiscal revenues, the disparities of actual fiscal revenue turn out to be larger, whereas their contribution of disparities within provinces exceeds the counterpart of disposable fiscal revenue. This phenomenon suggests that transfer payments and subsidies not only reduce the absolute value of Theil index and the imbalance of fiscal revenue on the whole, but also adjust the unbalanced internal structure. The latter is principally reflected in the reduction of the contribution of disparities within provinces, and the narrowing of the disparities of fiscal revenue within each province, which is beneficial to the governance of provincial units. In this case, we may give priority to this eclectic policy.

By differentiating the actual fiscal revenue from the disposable fiscal revenue added with transfer payments and subsidies, this paper elaborately analyze the tendencies and internal structures of fiscal revenue of all provinces and the whole country. The outcome suggests that the disparities of fiscal revenue at both local administrative and provincial levels bear a facade of favorably declining, which is virtually attributed to fiscal transfer payments and subsidies. Without respect to fiscal transfers and subsidies, it turns out just the opposite. (Given that) the central government, by means of transfer payments and subsidies, has reduced and transformed the consequence of the nationwide disparities of fiscal revenue, and has brought down the contribution of disparities within provinces. This paper makes a creative and constructive analysis on what the policies of various transfers and subsidies have achieved and why the tendency of disparities of fiscal revenue in China remains controversial in the academia. The further study of this paper could explore on which and to what extent the sub-items of fiscal revenue contribute to the disparities of fiscal revenue through decomposing Gini coefficient according to the sources of fiscal revenue.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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