

Study on the Effect of Regional Coordination Development of Tax Incentive: Quasi-natural Experiment based on Tax Sharing Below the Province

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Abstract

From the perspective of tax incentive, this paper calculates the proportion of VAT, business tax and regional coordinated development indicators of 282 prefecture-level cities from 1999 to 2013, and uses the dynamic panel GMM model to effectively analyze the relationship between intergovernmental tax sharing and regional coordinated development. The results proved that during the sample period, the prefecture-level VAT sharing and business tax sharing can significantly promote the regional development, namely, the central, the tax sharing. From the perspective of influence mechanism, the change of tax sharing between provincial governments and prefecture-level governments has a promoting effect on the coordinated development of economy, society and ecology in various regions, and finally makes the coordinated development among regions. Therefore, the tax sharing system between the provincial and local governments should be further improved to promote the coordinated development between the regions.

Keywords

Tax Sharing; Regional Coordinated Development; GMM Model; Principal Component Analysis Method.

1. Preface and Literature Review

In the process of continuous social and economic development, China has always attached great importance to the coordinated regional development. In March 2022, Li Keqiang again emphasized the balanced coordination of regional development in the government work report; in the next month, General Secretary Xi Jinping proposed to build a new pattern of coordinated regional development at the visit to Heilongjiang and promoting the revitalization of Northeast China. It can be seen that regional coordinated development has become a hot topic. In recent years, with the implementation of regional development strategy, the regional coordinated development has achieved significant and positive effect, the relative gap of regional development is generally narrowed, but the absolute gap is still large in the north and south, the fast and slow development in the north.

After the reform of the fiscal and tax system in 1994, each province has also established its own tax sharing framework, and the problem of insufficient funds for prefecture-level city governments appears frequently. Therefore, the sharing proportion between prefecture-level city governments and provincial governments has always been in a dynamic change. In order to verify the incentive effect of tax sharing, many domestic scholars conduct research on this.

Lv Bingyang, Li Zhao et al. (2021) found that tax sharing can stimulate the enthusiasm of local economic development, That is, it has a promoting effect of regional economic growth; Xie Zhenfa and Zhang Xiaoyu (2021) found through research that tax-sharing incentives will bring about the allocation of "tax-base-enhanced" public goods, Promoting better regional

development; Liu Yongzheng, Lu Bingyang et al. (2021) believe that the increase in the proportion of tax sharing will significantly promote the increase in the investment rate of prefecture-level cities, Thus promoting the rapid development of the economy, And even more so in economically underdeveloped areas; Zhao Bin (2022) believes through theoretical analysis that the current fiscal and tax policies should be improved to promote the coordinated development of regions.

Tax as an important means of national governance, in improving economic efficiency, balance regional development plays a key role, through the literature can see the tax into incentive effect, Lv Bingyang (2021) mentioned tax system has balance function, but compared with its incentive effect, did not analyze the tax effect of regional coordinated development, and no literature answer about this question. Therefore, this paper studies the regional coordinated development from the perspective of tax sharing incentive.

2. Theoretical Analysis of Regional Coordinated Development of Tax Incentive

After China's reform and opening up, China's fiscal and taxation system is mainly divided into two periods. Before 1994, the fiscal system system was completed, and after 1994, the tax distribution system was adopted. Before 1994, the fiscal package system gave the autonomy of fiscal revenue and expenditure to local governments, so as to encourage local governments to invest more resources in the process of local economic development and promote the rapid economic development. However, after taking the right of independent fiscal revenue and expenditure below, the central government is faced with a lack of fiscal revenue, unable to control the overall situation, and there are also some vicious competition among local governments.

In order to solve these problems, China carried out the tax distribution reform in 1994. On the basis of the original fiscal package system to stimulate the local economic development, and at the same time, the central government strengthened the macroeconomic regulation through tax distribution. The tax-sharing reform has significantly increased the proportion of central government revenue in national fiscal revenue, That is, local governments will pay part of the fiscal revenue to the central government in the adjusted share ratio, Providing financial support to the central government to narrow the gap between regions, More economically developed provinces pay more tax revenue, Economically backward areas pay less taxes, To a certain extent, it reflects the horizontal balance effect of tax sharing; In addition to the provincial government and the central government at these two levels of government, There are still the remaining three levels of government, Namely, prefecture-level, county-level and township governments, Therefore, there is also a certain proportion of tax sharing between provincial governments and prefecture-level governments, After the tax reform in 1994, In order to better coordinate the development between the regions, Also established its own tax-sharing framework, Municipal governments will submit their organized tax revenue to provincial governments in accordance with relevant regulations, The increase of fiscal revenue of provincial governments can regulate cities, counties and regions. On the one hand, the tax revenue of the relatively small tax base in the province is relatively small after the small tax base, so as to narrow the gap between the developed regions and the backward regions, showing the vertical balance function of tax sharing.

Based on this, this paper puts forward Hypothesis 1: tax sharing incentive may have a direct promotion effect on the coordinated regional development.

Notice on perfecting the provincial financial management system of the notice, the smaller manpower gap between provinces should lower tax ratio between provinces, municipal regions, and larger manpower gap between provinces should increase appropriate tax proportion

between provincial and municipal regions. For regions with small per capita income gap, if tax sharing ratio is low, local governments will get more tax revenue, grassroots governments can have a stable source of income, governments to stimulate local economy development; the higher the tax share ratio, the more provincial governments to the districts with smaller per capita income, so as to promote the balanced development of the province.

For the economically backward areas, the lower government enjoys more autonomy in fiscal revenue and expenditure, so as to promote the economic development of the jurisdiction, increase the tax sharing ratio, and give the higher government more financial support to promote the coordinated development between the districts. Backward regions emphasize rapid development, while relatively developed regions emphasize the macro-control of higher governments to promote balanced regional development. From an overall perspective, it has a promoting effect on the coordinated development among regions.

Based on the above analysis, hypothesis 2 is proposed that the impact of tax sharing on the coordination of regional development may have regional heterogeneity.

3. Model Construction and Data Description

3.1. Model Construction

This paper selects two productive tax bases, VAT tax and business tax, to study the effect of tax sharing on the regional coordinated development. Based on the basis of the above theoretical analysis, further empirical research is carried out. Therefore, the specific model designed in this paper is as follows:

$$Y_{it} = \alpha_1 + \beta_1 X1_{it} + \beta_2 X1_{it-1} + \gamma_1 C_{nit} + \mu_{1it} + \varepsilon_{1it} \quad (1)$$

$$Y_{it} = \alpha_2 + \beta_2 X2_{it} + \beta_2 X2_{it-1} + \gamma_2 C_{nit} + \mu_{2it} + \varepsilon_{2it} \quad (2)$$

Y_{it} is the comprehensive index of regional coordinated development; $X1_{it}$ is the core explanatory variable (VAT share); $X2_{it}$ is the core explanatory variable (business tax share ratio); C_{nit} is the control variable, including average employee wage (Inc2), urbanization level (C7), natural population growth rate (C8), openness to the outside world (C3), government influence (C6); μ_{1it} and μ_{2it} are individual fixed effects, and ε_{1it} and ε_{2it} are the error items.

3.2. Key Indicator Measure

3.2.1. Tax Sharing Index Measurement

The core explanatory variables are VAT sharing ratio (X1) and business tax sharing ratio (X2). Since there is no data record of tax sharing in each prefecture-level city, this paper refers to the method of Lu Bingyang (2021), and obtains the VAT sharing index and business tax sharing index.

Among them, $X1 = \text{total VAT revenue of provinces, cities and counties} / \text{VAT revenue organized by provincial tax departments}$

$X2 = \text{Total business tax revenue of provinces, cities and counties} / \text{business tax revenue organized by provincial tax departments}$

3.2.2. Measurement of Regional Coordinated Development Indicators

The explained variable is the regional coordinated development index (Y). In recent years, more and more scholars have begun to study the evaluation system of regional coordinated development indicators. Therefore, this article comprehensively references Deng Hongbin (2019), Chen Shaohui (2020) and China Regional Coordinated Development Index Report

(2021), and selects the following 22 indicators to construct the evaluation index of regional coordinated development.

Table 1. Selection of regional coordinated development measures

Economic level (Y1)	GDP (Yuan)	Social level (Y2)	Number of beds in the hospital and health center (Zhang)	The ratio of education expenditure to GDP	Ecological level (Y3)	Water resources ownership per capita (m ³)
	Total retail sales per capita (Yuan)		Mobile phone users (ten households)	Public Library collection per 100 people (volumes and pieces)		Industrial wastewater reaches the standard rate
	Fixed assets per capita (RMB)		Number of international Internet users (households)			Comprehensive utilization rate of industrial solid waste (percentage)
	Local fiscal revenue per capita (Yuan)		Number of college students per ten million students (people)			Industrial sulfur dioxide emissions (ton)
	Share of added value of secondary industry in GDP (percentage)		Number of participants covered in urban basic medical insurance (person)			Domestic sewage treatment rate (percentage)
	Share of the added value of the tertiary industry in GDP (percentage)		Number of urban workers participating in the basic old-age insurance (people)			Power consumption per GDP (percentage)
	Actual amount of foreign capital in current year (US million)		Number of persons insured by unemployment insurance (persons)			

3.3. Data Specification

3.3.1. Control the Variable Selection

The control variables are the average wage of employees (Inc2), urbanization level (C7), natural population growth rate (C8), degree of opening to the outside world (C3), and government influence (C6).

This paper refers to Liu Yongzheng (2021) to select the ratio of total import and export trade to GDP to express the degree of opening up; Xie Zhenfeng (2021) selects the annual average wage of employees and takes the logarithm; Zhou Mingming (2020) selects the ratio of general public budget expenditure to GDP to indicate government influence; Zhan Xinyu (2020) selects the ratio of non-agricultural population to total population to represent urbanization level; Xie and Zhan mention population factors as very important control factors, so it selects population natural growth rate as the control variable.

3.3.2. Data Description

The empirical part of the data including the provinces and counties, total VAT and business tax, VAT, tax revenue of regional tax department organization, provincial actual VAT tax, business tax revenue from China regional economic statistics Yearbook, China tax Yearbook and China statistical Yearbook, 1999-2002 some data is missing, through the national cities and counties financial statistics. The 22 indicators constructed by the regional coordinated development index system are all from the China City Statistical Yearbook. Some of the data are missing, and they are searched for the official websites and yearbooks of various prefecture-level cities and supplemented by certain technical means. For the accuracy of the experiment, Beijing, Shanghai, Chongqing, Tianjin municipalities were excluded, and due to the lack of data in Tibet.

4. Empirical Research on the Regional Coordinated Development of Tax Incentives

4.1. Base-point Regression Model

4.1.1. Benchmark Regression Model of VAT Sharing and Business Tax Sharing on Coordinated Regional Development

This paper uses the GMM model to analyze the effect of tax incentives on regional coordinated development, and introduces the current data and first-order lag data of tax sharing.

As shown in Table 2, (1) refers to the benchmark regression of coordinated development of VAT sharing and regions, and; (2) refers to the benchmark regression of coordinated development of business tax sharing and regions.

Table 2. Benchmark regression models

	(1)	(2)
VARIABLES	Y	Y
L.Y	1.019***(272.88)	1.022***(264.96)
X1	0.153***(2.82)	
Inc2	0.140***(15.91)	0.130***(14.46)
C7	-0.048***(-2.89)	-0.071***(-4.48)
C8	0.002***(3.45)	0.002***(3.44)
C3	-0.027***(-12.60)	-0.024***(-11.04)
C6	0.150***(2.09)	0.188*** (2.67)
X2		0.179***(6.72)
Constant	-1.318***(-17.36)	-1.327***(-16.28)
Observations	3,938	3,938
Number of stateid	282	282

The results show that the VAT sharing has a positive effect on promoting the coordinated regional development, that is, when the regional development coordination will be enhanced; the business tax sharing also has a positive effect on promoting the coordinated regional development, that is, when the business tax sharing rises, the regional development coordination will be enhanced. At this point, hypothesis 1 holds true.

4.1.2. Analysis of the Effect of VAT Sharing on the Coordinated Development of Economic, Social and Ecological Levels

As shown in Table 3, column (1) represents the regression results of the coordinated development of VAT sharing and economic level, column (2) represents the regression results of the coordinated development of VAT sharing and social level, and column (3) represents the regression results of the coordinated development of VAT sharing and ecological level.

Table 3. The regression results of VAT sharing on the three aspects of regional coordinated development

	(1)	(2)	(3)
VARIABLES	Y1	Y2	Y3
L.Y1	1.129***(383.51)		
X1	0.433***(10.61)	0.422***(10.28)	0.461***(11.88)
C1	0.000***(9.44)	0.000***(9.08)	0.000***(11.72)
lnc2	0.025***(6.79)	0.027***(7.00)	0.016***(6.15)
C7	0.048***(5.78)	0.047***(5.64)	0.043***(5.19)
C8	-0.001***(-2.83)	-0.001***(-3.11)	-0.001***(-2.85)
C3	-0.013***(-10.94)	-0.012***(-10.67)	-0.018***(-22.18)
C6	0.169***(5.83)	0.172***(5.72)	0.168***(8.44)
L.Y2		1.129***(383.51)	
L.Y3			1.131***(383.01)
Constant	-0.451***(-13.93)	-0.439***(-12.87)	-0.916***(-46.06)
Observations	3,938	3,938	3,938
Number of stateid	282	282	282

The results show that VAT sharing has a positive promotion effect on the coordinated development of economic, social and ecological levels, that is, when VAT sharing increases, the coordination of economic development, social development and ecological development will be continuously enhanced. This conclusion also strengthens The Establishment Of Hypothesis 1.

4.1.3. Heterogeneity Analysis

Table 4. Results of the heterogeneity test

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Y	Y	Y	Y	Y	Y	Y	Y
L.Y	1.071*** (2,130.43)	0.672*** (126.84)	1.101*** (660.45)	0.896*** (148.74)	1.073*** (2,137.71)	0.707*** (151.62)	1.101*** (497.95)	0.901*** (101.61)
X1	0.530*** (13.83)	2.624*** (38.30)	-0.093*** (-4.07)	0.593** (2.03)				
C8	-0.001*** (-3.73)	0.007*** (15.70)	0.006*** (16.64)	-0.015*** (-8.76)	0.000 (0.48)	0.011*** (22.34)	0.006*** (18.34)	-0.015*** (-8.13)
lnc2	0.112*** (99.39)	0.603*** (68.25)	0.048*** (15.35)	0.359*** (18.74)	0.101*** (79.03)	0.511*** (84.47)	0.043*** (9.65)	0.341*** (17.25)
C7	-0.190*** (-76.58)	0.350*** (19.02)	-0.152*** (-13.64)	1.276*** (7.05)	-0.215*** (-81.60)	0.039*** (3.31)	-0.131*** (-11.35)	1.244*** (7.64)
C3	-0.035*** (-91.18)	0.109*** (17.13)	-0.032*** (-14.24)	0.136*** (8.61)	-0.033*** (-55.79)	0.131*** (35.75)	-0.037*** (-16.43)	0.163*** (7.78)
C6	0.111*** (8.70)	- 1.845*** (-14.61)	0.339*** (22.81)	-1.243*** (-6.12)	0.109*** (8.55)	- 1.331*** (-14.91)	0.343*** (11.13)	-1.144*** (-5.30)
X2					0.179*** (9.57)	0.372*** (23.18)	0.045*** (4.06)	0.353*** (5.01)
Constant	-1.069*** (-94.76)	- 5.712*** (-76.30)	-0.569*** (-21.03)	-3.722*** (-24.29)	-1.014*** (-72.12)	- 4.687*** (-76.41)	-0.570*** (-17.74)	-3.718*** (-21.45)
Observations	1,176	1,131	1,155	476	1,176	1,131	1,155	476
Number of stateid	84	81	83	34	84	81	83	34

In this paper, the sample is divided into eastern, central, western and northeast regions including Hebei, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan; central region including Shanxi, Anhui, Jiangxi, Henan, Hubei, Hunan; western region including Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Inner Mongolia, Guangxi; and northeast region including Liaoning, Jilin and Heilongjiang.

(1) (2) (3) (4) indicates the coordinated development effect of VAT sharing on the four regions of eastern, central, western and northeast respectively; (5) (6) (7) (8) indicates the coordinated development effect of business tax sharing on the eastern, central, western and northeast regions respectively. The results show that the VAT sharing promotes the eastern, central, and northeastern regions, with the negative effect, the VAT tax sharing promotes the coordinated development of the eastern, central, western and northeast regions; the business tax sharing is the least, namely the least promotion effect.

4.2. Robustness Test

This paper mainly replaces the core explanatory variables to conduct the robustness test. This paper refers to the method of Zhou Li'an (2015) and uses the ratio of the total tax revenue of all provinces and counties to the actual tax revenue obtained by each province as the tax sharing ratio index.

VAT tax sharing ratio (WX1) = the total VAT revenue of all provinces, cities and counties / the VAT revenue actually obtained by each province

Business tax sharing ratio (WX2) = the total business tax revenue of all provinces and counties / the business tax revenue actually obtained by each province

Table 5. Regression Results of VAT Sharing and Business Tax Sharing on Regional Coordination Development

VARIABLES	(1)	(2)
	Y	Y
L.Y	1.016***(265.04)	1.018***(256.73)
WX1	0.084***(6.46)	
lnc2	0.139***(15.82)	0.140***(16.29)
C7	-0.045***(-2.71)	-0.063***(-3.92)
C8	0.002***(3.48)	0.002***(3.30)
C3	-0.028***(-12.28)	-0.027***(-12.35)
C6	0.163**(2.20)	0.185***(2.85)
WX2		0.146***(5.74)
Constant	-1.346***(-17.57)	-1.399***(-17.36)
Observations	3,938	3,938
Number of stateid	282	282

According to the results after replacing the core explanatory variables, it can be seen that the promotion effect of VAT sharing and business tax sharing on regional coordinated development is still very significant, and the direction of action has not changed. The effect of business tax sharing is stronger than that of VAT sharing, and the robustness test is passed.

5. Research Conclusion and Policy Suggestions

5.1. Research Conclusion

- 1) Tax sharing has a promoting effect on the coordinated regional development, which is mainly reflected in the promoting effect of tax sharing on the economic, social and ecological levels.
- 2) Increasing the proportion of tax sharing in the eastern, central and northeast regions can significantly promote the coordinated development among regions, and have a small effect on promoting the coordinated development of the western region, and even inhibit it.

5.2. Policy Suggestions

- 1) Give full play to the role of tax sharing incentive and balance, and further improve the tax sharing system between provincial and municipal governments. Give full play to the role of tax incentive, but also to give consideration to its balanced role. To ensure that the higher-level government can bear the role of fiscal expenditure for macro-control, but also to avoid the role of vicious competition among the lower-level governments.
- 2) Set up tax sharing policies according to local conditions. Regions with large per capita income gap can appropriately increase the proportion of tax sharing, and regions with small per capita income gap can appropriately lower the proportion of tax sharing.

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