Research on the Impact of Local Tax Revenue and Tax Structure on the Upgrading of Local Industrial Structure

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Abstract: In order to study the local tax system and the upgrading level of regional industrial structure, this paper is based on the panel data of 31 provinces (autonomous regions and municipalities directly under the central government) in China from 2005 to 2019, and through the fixed effect model, the local tax revenue. An empirical study was conducted on the impact of the tax system structure on the upgrading of local industrial structure. The conclusion of the study shows that whether it is a nationwide or divided into three economic belts in the east, central and west, out of the goal of upgrading the industrial structure, a set of gradually reducing the proportion of turnover tax should be established under the premise of ensuring the level of local tax revenue increase the proportion of income tax and property tax in the local tax system.

Keywords: local tax revenue; tax structure; turnover tax; income tax; property tax; industrial structure upgrade

1   Introduction

The "Proposal of the CENTRAL Committee of the Communist Party of China on Formulating the Fourteenth Five-Year Plan for National Economic and Social Development and the Long-term Goals for the Year 2035" proposes that from the perspective of industrial structure, it is necessary to accelerate the development of the modern industrial system and promote the optimization and upgrading of the economic system. In terms of taxation, it is necessary to improve the modern tax system, improve the local tax and direct tax systems, optimize the tax system, moderately increase the proportion of direct taxes, and deepen the reform of the tax system. Between 2005 and 2019, China's local tax revenue continued to grow, but the growth rate of local tax revenue began to decline continuously since 2011, from 2011 25.7% fell to 3.24% in 2016, and in 2016, the growth rate of local tax revenue began to increase due to the VAT reform, and in 2018.After the merger of national land taxes, the growth rate of local taxes has fallen again. From the perspective of tax structure, turnover tax accounts for a large proportion of China's local tax system, and in 2019, the proportion of turnover tax is 40.51%, the proportion of income tax is 22.96%, property tax accounts for 26.64%, and other small taxes account for only 9.60% in total. It can be seen that the structure of the local tax system is difficult

to adapt to the pressure brought about by the upgrading of the industrial structure, which will inevitably affect the financial self-sufficiency of local governments and the improvement of local economic level. The current situation of economic development has forced the reform of China's fiscal and taxation system, and in the reform of the tax system, the improvement of the local tax system has become the theme of the reform.

2　Literature review

2.1　The Impact of Tax Revenue on the Upgrading of Industrial Structure

The impact of local tax revenue on the upgrading of industrial structure, scholars have the following conclusions, some scholars believe that increasing tax revenue is conducive to the upgrading of local industrial structure. (Liu 2017) and others believe that if we want to promote the upgrading of industrial structure, we should do so under the ability to ensure local tax revenues. [7] (Zhang 2015) indicated that those who promote the upgrading of the industrial structure should reconstruct the relationship between the central and local finances, optimize the industrial structure, and promote the upgrading of the industrial structure. [10] In the study of the relationship between industrial structure and tax revenue, most scholars take industrial structure as the explanatory variable and tax revenue as the explained variable such as (Nie 2018) By analyzing the relationship between the change in tax revenue and the change in the added value of the three industries, it is believed that optimizing the industrial structure can effectively increase tax revenue. [8]

2.2　The Impact of the Tax Structure on the Upgrading of Industrial Structure:

Many scholars have made many studies on the impact of the tax structure on the upgrading of the industrial structure, and (Huang 2016) pointed out that the value-added tax has a positive effect on the optimization and upgrading of the industrial structure. [4] However, (Xie 2021) conducted an empirical analysis of the tax distribution policies of value-added tax and business tax, and the results showed that the tax score was high. It has a certain inhibitory effect on the development of the manufacturing industry, but it has played a role in promoting the development of the tertiary industry such as the service industry. [9] (Cao 2012) believes that raising capital and consumption taxes and lowering labor taxes can promote the optimization and upgrading of the industrial structure. [2] (Liu 2017) shows that there is a positive correlation between the tax structure and the industrial structure in the short term, but there is a relationship, in the long run, there is a negative correlation. [6] (Li 2015) believes that it is necessary to accelerate the reform of real estate tax, strengthen the management of land value-added tax liquidation, return the income of the real estate industry to a reasonable level, and promote the upgrading of the industrial structure. [5] (Chen 2015) believe that in order to accelerate the upgrading of industrial structure, it is necessary to curb the development of high-energy-consuming and high-polluting industries and deepen the reform of resource taxes. [1]

Through literature combing, it can be found that the main research direction of most of the articles is the impact of industrial structure upgrading on the growth of tax revenue, while the research on how local tax revenue affects the upgrading of industrial structure is very rare, and scholars do not have a very unified opinion on the relationship between the growth of local tax revenue and the upgrading of local industrial structure. No matter what stage of industrial

structure development, the government needs to provide certain fiscal and taxation policy support, and fiscal and taxation policies have a guiding and supporting role in the development of industrial structure. This paper uses the method of empirical research to discuss the role of China's local tax system and structural adjustment on the upgrading of local industrial structure from the two aspects of tax revenue and tax structure, and puts forward reasonable suggestions for improving the local tax system and thus promoting the upgrading of industrial structure.

3   Formulations of theoretical hypotheses

The tax system is an important tool for the state to regulate and control the macro economy, and its impact on China's industrial structure has three aspects: First, from a micro perspective, taxation promotes the optimization of industrial structure through the impact on product output and price adjust. Second, from the mesoscopic point of view, taxation affects the costs and profits of different industries, causing production factors to flow between industries, bringing about the results of differentiated development of industries. Third, from a macro perspective, taxation adjusts the industrial structure through the impact on national income. In practice, through the output effect and substitution effect, taxation exerts efforts at both the supply side and the demand side to achieve the industrial policy goal of targeted and precise regulation and control, and effectively promote the optimization and upgrading of the industrial structure. Therefore, propose:

H1: Increasing local tax revenue has a role in promoting the upgrading of local industrial structure.

H2: A reasonable tax structure has a positive effect on the upgrading of local industrial structure.

4   Model settings, variable settings and data sources

4.1 Model Settings

This paper uses panel data from 31 provinces to analyze the impact of local tax revenue and tax structure on industrial structure upgrading, and according to the results of Hausman's test, the fixed-effect model is more suitable for the research and analysis of this paper than the random effects model. Referring to Liu to build the model, the econometric model is set as follows:

$$inds_{it} = \beta_0 + \beta_1 ptax_{it} + \beta_2 tunrntax_{it} + \beta_3 inctax_{it} + \beta_4 proptax_{it} + \beta_5 lnurban_{it} + \beta_6 lnfd_{it} + \beta_7 open_{it} + \beta_8 ppln_{it} + \beta_9 invt_{it} + \mu_i + v_t + \varepsilon_{it}$$

(1)

Among them $inds_{it}$ the explanatory variables include local tax revenue ($ptax_{it}$), and the tax structure is represented by the turnover tax system structure ($tunrntax_{it}$), the income tax system structure ($inctax_{it}$), and the property tax system structure ($proptax_{it}$). The control variables include, the logarithm of the level of urbanization ($lnurban_{it}$), the logarithm of fiscal decentralization ($lnfd_{it}$), the degree of opening up ($open_{it}$), the number of domestic patent applications authorized($ppln_{it}$), the amount of fixed asset investment in the whole society

($invt_{it}$) μ_i represents the individual effect, represents v_t the time effect, ε_{it} and so on Represents random interference terms, subscripts i , and t regions and years.

4.2 Variable Settings

Interpreted Variables: The optimization of the industrial structure (inds) is to develop the industrial structure from a low-level and loose state to a reasonable direction. The overall law of industrial structure upgrading is that the proportion of the primary industry to the secondary industry and the tertiary industry continues to increase. Therefore, the interpreted variables of the local industrial structure upgrading level in this paper refers to the research of (He 2018), which is measured by the ratio of the added value of the tertiary industry to the added value of the secondary industry, and is expressed by inds. [3]

Main Explanatory Variables: Local tax revenue refers to the local fiscal tax revenue data released by the National Bureau of Statistics, and the measurement method used to measure local tax revenue is to divide the sum of local tax revenue by the total population of the province at the end of the year to obtain per capita local tax revenue, expressed in pax.

The tax structure is measured by dividing taxation into taxes on goods and services, income and property according to the definition of the tax structure, according to the nature of the object of taxation. The tax structure in this paper uses the ratio of turnover tax, income tax and property tax to local tax revenue. Among them, the circulation theory mainly includes business tax and value-added tax, expressed in convertax; income tax is personal income tax and corporate income tax, expressed in inctax; property tax mainly includes land value-added tax, urban land use tax, resource tax, real estate tax, vehicle and vessel tax and deed tax, using proptax representation.

Control Variables: The control variables are fiscal decentralization (fd) is expressed by the logarithm of fiscal revenue decentralization, the level of urbanization(urban) is measured by the ratio of urban population to total population at the end of the year. The degree of opening to the outside world (open) is expressed by the proportion of the total import and export volume of each province in GDP; the level of innovation (ppln) is expressed by the number of domestic patent applications granted per capita in the province.

4.3 Data Sources

This paper takes panel data from 31 provinces in China from 2005 to 2019 as a sample, and uses the China Statistical Yearbook, the website of the National Bureau of Statistics, the China Tax Yearbook, and the National Statistical Yearbook as the data sources. The descriptive statistics of the relevant variables are shown in Table 1:

Table 1 Descriptive statistics of variables

Variable symbols	Observations	average value	standard deviation	minimum	maximum
inds	465	1.192	0.631	0.547	4.575
ptaxs	465	3702	3978	291.1	25928
turntax	465	0.490	0.0695	0.355	0.697
inctax	465	0.192	0.0522	0.112	0.377

proptax	465	0.201	0.0676	0.0351	0.361
lnfd	465	-3.807	0.981	-7.013	-2.128
lnurban	465	-0.67	0.279	-1.501	-0.114
ppln	465	7.12	10.25	0.146	61.15
open	465	0.0449	0.0517	0.0019	0.23
invt	465	0.755	0.286	0.211	1.597

5 Analysis of empirical results

This paper uses Stata15 software to estimate the relevant parameters, Table 2 is a nationwide sample empirical results. The results of models (1), (2), (3), and (4) all show that the coefficient of per capita local tax revenue is significantly positive at the 1% level, indicating that appropriately increasing local tax revenue will promote the upgrading of local industrial structure. To a large extent, local tax revenue reflects the self-sufficiency rate of local finance and local finance, and the abundance of local financial resources is an important guarantee for local governments in macroeconomic regulation and control.

Table 2 National sample regression results

Variable name	(1) inds	(2) inds	(3) inds	(4) inds	(5) inds2	(6) inds2	(7) inds2	(8) inds2
ptaxs	0.262***	0.279***	0.313***	0.286***	0.018***	0.020***	0.028***	0.023***
	(9.86)	(10.32)	(11.98)	(10.91)	(3.77)	(4.31)	(6.14)	(5.03)
turntax	-0.391*	-0.926***			-0.119***	-0.210***		
	(-1.87)	(-5.11)			(-3.27)	(-6.65)		
inctax	0.900***		1.043***		0.153***		0.199***	
	(2.98)		(3.48)		(2.90)		(3.75)	
proptax	1.232***			1.490***	0.208***			0.288***
	(4.15)			(5.65)	(4.01)			(6.19)
lnfd	-0.589***	-0.626***	-0.663***	-0.567***	-0.099***	-0.105***	-0.112***	-0.094***
	(-9.96)	(-10.62)	(-11.05)	(-9.45)	(-9.55)	(-10.21)	(-10.58)	(-8.89)
lnurban	0.282**	0.531***	0.782***	0.290**	0.181***	0.223***	0.279***	0.184***
	(2.28)	(5.08)	(8.23)	(2.30)	(8.36)	(12.24)	(16.57)	(8.29)
invt	-0.006***	-0.006***	-0.007***	-0.005**	-0.000	-0.000	-0.000	-0.000
	(-2.87)	(-2.66)	(-3.11)	(-2.55)	(-0.87)	(-0.70)	(-1.24)	(-0.59)
open	-3.304***	-3.030***	-3.033***	-3.028***	-0.576***	-0.530***	-0.522***	-0.522***
	(-5.15)	(-4.63)	(-4.55)	(-4.66)	(-5.14)	(-4.65)	(-4.42)	(-4.55)
ppln	-0.094*	-0.095**	-0.070	-0.126***	-0.014	-0.014	-0.009	-0.020**
	(-1.96)	(-1.97)	(-1.41)	(-2.61)	(-1.61)	(-1.63)	(-1.03)	(-2.32)
_cons	-0.829***	-0.132	-0.771***	-0.803***	0.235***	0.353***	0.218***	0.211***
	(-2.82)	(-0.51)	(-2.91)	(-3.17)	(4.60)	(7.81)	(4.65)	(4.73)
N	465	465	465	465	465	465	465	465
R^2	0.714	0.698	0.689	0.702	0.750	0.737	0.719	0.734

Note: ***, **, * are indicated to be significant at the 1%, 5%, and 10% significance levels, respectively, and the values in parentheses are t-values

As far as the tax structure is concerned, first, the proportion of turnover tax is significantly negative in the model (1) and model (2), indicating that increasing the proportion of turnover tax is not conducive to the upgrading of the local industrial structure, and the turnover tax in the local tax system is mainly composed of value-added tax and business tax. From the perspective of China's current tax structure structure, the setting of value-added tax is too simple and the scope of collection is too narrow, so that the behavior of market entities is not restricted by the overall tax burden. When the government implements differential tax rates, it is difficult to macro-guide the production and consumption of enterprises and residents. This is still the case in model (2) when only the turnover tax structure is considered. Second, the coefficient of income tax in model (1) and model (3) is significantly positive at the level of average 1%, indicating that the higher the proportion of income tax, the higher the level of industrial structure upgrading. The income tax in this article is composed of personal income tax and corporate income tax, and the weight of personal income tax will affect personal disposable income due to the impact of the tax burden effect of corporate income tax on corporate profits and economic decision-making, enterprises are more inclined to produce high-profit products or redistribute resources, and actively adjust production strategies, thereby promoting the optimization of industrial structure. Third, the coefficient of the proportion of property tax is positively correlated with the 1% level of industrial structure upgrading in both model (1) and model (4). It shows that increasing the proportion of property tax is conducive to the upgrading of the industrial structure. The property tax in this article includes resource tax, real estate tax, land value-added tax and so on when calculating. Therefore, the implementation of resource taxes by the state can effectively curb the development of high-consumption and high-pollution industries, promote the transformation of resource-intensive industries to knowledge-intensive, and provide an empirical basis for using real estate taxes as local tax revenues.

For the control variable, fiscal decentralization, the coefficient on the level of industrial structure upgrading in the four models is significantly negative at the level of 1%, indicating that fiscal decentralization has an inhibitory effect on the upgrading of industrial structure. With the continuous deepening of China's economic system reform, inter-regional rent-seeking behavior has gradually become an important factor in promoting the growth of regional tax revenue, and local governments have obtained rents brought about by the distribution of resource elements by strengthening local protectionism, which inhibits the free circulation of production factors in the market, thereby restricting the upgrading of industrial structure. The coefficient of urbanization level is significantly positive in all four models, indicating that the higher the level of urbanization, the more conducive it is to the upgrading of industrial structure. The impact of innovation level, opening up and investment level on industrial structure upgrading is significantly negative at the level of 1% from the perspective of 4 models. It shows that the higher the level of innovation, the less conducive it is to the upgrading of the industrial structure, and the higher the degree of opening up to the outside world and the higher the amount of investment in fixed assets, which will inhibit the upgrading of the industrial structure.

In order to test the stability of the model, from the perspective of variable substitution, the level of regional industrial structure upgrading is measured by the ratio of the added value of the tertiary industry to GDP in the current year, and the stability of the equation is tested, and the regression results are shown in the model (5), (6), (7), (8). The regression results show that the symbols and significance of the variable coefficients do not vary significantly, indicating that the model is stable.

In order to test the regional heterogeneity, according to the economic and technological development level and location conditions of the 31 provinces in China, the country is divided into three major regions. Considering the space limitation, this paper only presents the regression results of the regional heterogeneity test. The significance level of the main explanatory variable tax revenue in the eastern region and the direction of its effect on the regional industrial structure are consistent with the national-wide effect, that is, the effect of local tax revenue on the regional. The level of industrial structure has a positive promoting effect, while the effect of tax revenue on the industrial structure in the central region is negative. The results in the western region show that the direction of local tax revenue and the level of industrial structure upgrading is positive, but the results are not significant, indicating that the promotion effect of local tax revenue on industrial structure upgrading is not stable, and local tax revenue has a significant impact on local industries. Structural upgrading has regional heterogeneity.

The proportion of turnover tax in the tax structure, the role direction of the three regions in the east, central and west is the same as the direction of the national role, that is, the higher the proportion of circulation tax, the lower the level of regional industrial structure upgrading. The proportion of income tax, the performance of the eastern and western regions is consistent with the national direction, all show that the increase in the proportion of income tax has a certain role in promoting the level of regional industrial structure, while the central region shows that the proportion of income tax has a negative effect on the upgrading of the regional industrial structure, but it is not significant. The performance of the eastern, central and western regions in the proportion of property tax is consistent with the direction of the whole country, and they are all positive, indicating that the collection of resource taxes and real estate taxes in various regions of China is conducive to promoting the upgrading of the industrial structure, that is, the increase in the proportion of property taxes is conducive to the improvement of the level of local industrial structure.

6   Research conclusions and policy recommendations

6.1 Conclusions of the Study

As an important means of national macro-control, local taxes should play a certain role in the upgrading of local industrial structure, and the conclusion of this article shows that the increase in the proportion of local tax revenue, income tax and property tax has indeed played a positive role in the process of upgrading China's industrial structure. And the results are consistent both from the national sample and the sub-regional sample.

In terms of tax structure, according to the sub-sample and sub-model, the high proportion of turnover tax has a restraining effect on the upgrading of the industrial structure. The proportion of income tax except for the central regional is a suppressive effect when only considering the structure of the income tax system, and the results of other models are all shown to promote the upgrading of industrial structure. From the perspective of the impact of the proportion of property taxes on the upgrading of the industrial structure, whether it is nationwide or sub-regional, or sub-model, the increase in the proportion of property taxes will be conducive to the upgrading of the local industrial structure.

6.2 Policy Recommendations

In view of the above conclusions, the following suggestions are given: First, to ensure the self-sufficiency of local finance, establish and improve the local fiscal revenue distribution system, ensure the stability of local finance, and promote the upgrading of industrial structure and economic development.

Second, to cultivate local main tax types, the local tax system should gradually increase the proportion of direct taxes, reduce the proportion of turnover taxes, continuously optimize the structure of the tax system, improve the modern tax system, and promote the optimization and upgrading of the industrial structure.

Third, promote the optimization of the local tax system structure in coordination. After the implementation of "replacement of business tax with value-added tax", local governments have a large gap in the subject of taxation, and it is necessary to speed up the construction of local taxation systems, and gradually build an income tax and property tax as the mainstay local tax system. For example, the consumption tax can be assigned to local governments, and the scope of collection can be adjusted. In addition, the gradual introduction of property taxes such as real estate tax can not only organize revenue for the government, but also guide the upgrading of the industrial structure, thereby promoting high-quality economic development.

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