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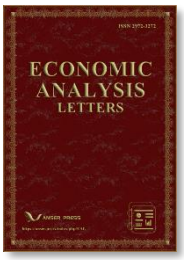

The impact of digital economy development on local fiscal revenue efficiency

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ABSTRACT

The vigorous development of the digital economy has brought new opportunities and challenges to the construction of local fiscal revenue efficiency. Based on the panel data from 2011 to 2020, this paper uses the fixed effect model, instrumental variable method and other empirical studies to investigate the impact of the development of the digital economy on the efficiency of local fiscal revenue. The research results show that the development of the digital economy has directly improved the efficiency of local fiscal revenue, and the regression results of instrumental variables are still significant. The mechanism analysis shows that the development of digital economy mainly promotes local fiscal revenue such as efficiency improvement by cultivating tax sources.

KEYWORDS

Digital economy development; Fiscal revenue efficiency; China

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1. Introduction and literature review

The digital economy has become the core force driving China's economic development. Since China put forward the "National Big Data Strategy" in 2015, policies to promote the development of the digital economy have been continuously deepened and implemented. China's digital economy has made great achievements. The "White Paper on China's Digital Economy Development (2022)" shows that the scale of China's digital economy reaches 45.5 trillion yuan in 2021, accounting for 39.8% of GDP. The growth rate of the digital economy has become a key driving force and an important support for stable economic growth. With the development of the digital economy, China has undergone major changes at the basic level of the economy, and the structure of fiscal revenue and the system of fiscal revenue and expenditure have also undergone corresponding changes. The development of the digital economy has brought opportunities and challenges to the improvement of local fiscal revenue efficiency.

Since the reform and opening up, especially the reform of the tax-sharing system between the central and local governments in 1994, the central government has “entrusted” the local governments with corresponding fiscal responsibilities and fiscal goals through fiscal decentralization, in order to maximize social welfare, optimize resource allocation, and ensure the national economy. goals of stability and growth. In the context of fiscal decentralization, the fiscal revenue structure of local governments in my country has been affected, and the efficiency of fiscal revenue has also undergone significant changes. During the "14th Five-Year Plan" period, affected by the complexity and uncertainty of the international and domestic economic environment, the downward pressure on my country's economy has intensified, and finances are facing unprecedented challenges. The "multiple superposition" of factors such as the reduction of the financial source base, the slowdown of fiscal revenue growth, and the increase in fiscal expenditure demand have put forward higher requirements for the construction of local fiscal revenue efficiency. The rapid development of the digital economy has brought an impact on the optimization of my country's tax system, the construction of tax sources, and tax collection and management, and indirectly affects the efficiency of local fiscal revenue. With the development of the digital economy, the Chinese government is undergoing a profound transformation process in terms of revenue and expenditure scale and structure. Different local governments will have differences in the provision of public goods and social services due to their financial capabilities and differentiated characteristics of digital economy construction, which in turn will affect their own fiscal efficiency through the scale of fiscal revenue and expenditure and the structure of fiscal expenditure.

Liu et al. (2021) used the super-efficiency SBM-DEA method to measure provincial-level total factor productivity and fiscal efficiency related indicators, comprehensively considered the efficiency of fiscal revenue and expenditure, and investigated the mechanism of fiscal efficiency on total factor productivity under the threshold effect model. influence path. Wang and Han (2021) selected the panel data of 31 provinces from 2004 to 2018, and used the super-efficiency DEA model to measure the local fiscal efficiency. They found that fiscal competition has spatial spillover effects on local fiscal efficiency. Yang and Guo (2020) proved through empirical research on 29 provinces in China that there is indeed a positive relationship between local fiscal transparency and fiscal efficiency.

The above literature has important reference value for this study, but there is still room for further research. First, in terms of research content, the existing research mainly focuses on the theoretical elaboration of the path to the realization of local fiscal revenue efficiency affected by the development of the digital economy. There are few literatures that quantitatively study the specific impact of the development of the digital economy on the efficiency of local fiscal revenue. Extremely lacking, pending further quantitative analysis. Second, in terms of indicator design, most literature uses digital infrastructure to measure the development of the digital economy, which is reasonable to a certain extent. However, with the enrichment of the digital economy, a more comprehensive, accurate and scientific index system is needed. Third, in terms of research methods, relevant literature uses finite element models and GMM models to reveal the correlation between ICT or Internet development and local fiscal revenue. It is worth noting that the problem of endogeneity cannot be ignored. Therefore, on the basis of previous relevant literature,

this paper optimizes the index measurement system for the development of the digital economy, and studies the impact of the development of the digital economy on the efficiency of local fiscal revenue. In addition, IV tests are used to address endogeneity issues in robustness tests.

The marginal contribution of this paper is as follows: First, from the perspective of digital economy development, this paper examines its impact on changes in the efficiency of local government fiscal revenue, which is an enrichment and supplement to the theory. Second, this paper constructs an evaluation index system for local digital economy development and fiscal revenue efficiency, and calculates the data of digital economy development and fiscal efficiency at the inter-provincial government level in China. Third, use the fixed effect model and the instrumental variable method to estimate the relationship between the development of the digital economy and the efficiency of local fiscal revenue. In addition, analysis of regional heterogeneity was performed. In general, this paper enriches the understanding of the relationship between the development of the digital economy and the efficiency of local government fiscal revenue from the perspectives of finance and information economics, and provides a useful exploration for future academic research.

2. Empirical strategy

2.1. Empirical method

In order to test the impact of the development of the digital economy on the efficiency of local fiscal revenue in this region, this paper uses a fixed effect model to make a preliminary judgment. The model is shown in formula (1):

$$Fisef_{it} = \alpha + \beta Digeco_{it} + \lambda X_{it} + \mu_i + \nu_t + \xi_{it} \quad (1)$$

Where i and t are region and time respectively. Fisef and Digeco are local government fiscal revenue efficiency and digital economy development level respectively. X are control variables. μ_i and ν_t are individual and time fixed effects. ζ_{it} is a random perturbation term.

2.2. Variables and data

The independent variable is digital economy development. Refer to Liu et al. (2020), the index system of China's digital economy development is constructed as follows, see Table 1. This paper uses the entropy weight method to measure the digital economy development level of 30 provincial-level administrative regions in China.

Table 1. Index system of digital economy development.

Primary index	Secondary index	Specific indicators
Information development	Informatization foundation	Optical cable width
		Mobile phone base station density
		Proportion of information practitioners
	Informatization influence	Total telecom business
		Software business revenue
Internet development	Fixed internet foundation	Internet access port density
	Mobile Internet Foundation	Mobile internet penetration rate
	Fixed Internet Impact	Proportion of broadband internet users
	Mobile internet impact	Proportion of mobile internet users
Digital transaction development	Fundamentals of digital transactions	The number of websites owned by every hundred enterprises
		The number of websites owned by every hundred enterprises

		Proportion of e-commerce enterprises
	Digital transaction impact	E-commerce sales
		Online retail sales

Local fiscal revenue efficiency is the dependent variable. Referring to Liu et al. (2021), we construct the following local fiscal revenue efficiency indicators.

Table 2. Index system of local fiscal revenue efficiency.

Primary index	Secondary index	Specific indicators
Local fiscal revenue efficiency	Input indicators	Added value of secondary and tertiary industries
		Local tax authorities
		Per capita disposable income of urban residents
		Industrial producer price index (PPI)
	Output indicators	Local tax revenue

Referring to published literature (Wu et al., 2020, 2021; Zheng et al., 2022), we use urbanization level (Urban), logarithm of GDP (Lngdp), industrial structure (Str), and technological level (Tec) as control variables. (1) Urban is represented by the ratio of the urban population to the total population in each region. (2) Lngdp is the gross domestic product of each region. (3) Edu is the proportion of urban resident population to permanent resident population. (4) Tec is R&D expenditure intensity. The data comes from "China Statistical Yearbook" and "China Fiscal Yearbook".

3. Empirical results and discussion

3.1. Baseline result

In order to systematically examine the impact of the digital economy on the efficiency of local fiscal revenue, fixed effect model is used. The estimated results are shown in Table 3. The results of columns (1)-(6) show that the impact coefficient of Digeco is significantly positive, and the development of the digital economy significantly promotes the efficiency of local fiscal revenue. The main reason may be that the digital economy and the government digitization supported by it will improve the tax collection and management efficiency of local governments. When digital technology is not popularized, the taxation system and policies cannot effectively guarantee taxation rights and tax benefits, and cannot find the important role of digital enterprises in economic development. With the development of digital technology, the tax collection and management department can manage and control taxes more efficiently, further improving tax collection efficiency. In addition, the development of the digital economy will drive the improvement of the economic level, thereby increasing wage levels and increasing employment opportunities, expanding the scale of personal income tax and increasing tax revenue.

Table 3. Baseline result.

	(1)	(2)	(3)	(4)	(5)	(6)
Digeco	0.084***	0.120***	0.058***	0.052**	0.049**	0.037*
	(4.612)	(6.070)	(2.943)	(2.528)	(2.330)	(1.756)
Urban		0.162***	0.016	-0.001	-0.004	0.006
		(4.064)	(0.394)	(-0.023)	(-0.085)	(0.133)
Lngdp			0.052***	0.051***	0.049***	0.049***
			(7.658)	(7.604)	(6.774)	(6.809)

Edu				0.000	0.000	0.000
				(0.992)	(1.159)	(0.802)
Str					-0.000	-0.000
					(-0.862)	(-0.724)
Tec						0.011**
						(2.503)
Cons	0.906***	0.763***	0.792***	0.805***	0.830***	0.763***
	(133.347)	(21.332)	(24.316)	(22.954)	(18.143)	(14.479)
Year FE	√	√	√	√	√	√
Province FE	√	√	√	√	√	√
N	300	300	300	300	300	300
r2_a	0.980	0.981	0.984	0.984	0.984	0.985

*Note: t statistics in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01*

3.2. Instrumental variable (IV) estimation

The express business volume (Post) is used as an IV for digital economy development. In terms of exogenousness, the express delivery business measures the development of the logistics industry and will not have a direct impact on the explained variable local fiscal revenue efficiency. In terms of relevance, one of the operating modes of the digital economy is e-commerce, which directly drives the growth of express delivery business. The results show that after using the instrumental variable of express business volume, the impact coefficient of the digital economy on the efficiency of local fiscal revenue is significantly positive at the 1% level, and the results are robust.

Table 4. IV estimation result.

	(1)	(2)	(3)	(4)
	First stage regression		Second stage regression	
Digeco			0.107***	0.085***
			[7.274]	[3.912]
Post	0.002***	0.001***		
	(12.61)	(15.73)		
Urban		-0.795***		0.064
		(-6.68)		[1.230]
Lngdp		0.098***		0.044***
		(5.84)		[4.826]
Edu		0.000		0.000
		(0.20)		[0.187]
Str		-0.000		-0.000
		(-0.42)		[-0.370]
Tec		0.004		0.009*
		(0.60)		[1.880]
Cons	0.302***	0.729***	0.899***	0.718***
	(11.80)	(6.45)	[158.56]	[12.892]
Year FE	√	√	√	√
Province FE	√	√	√	√
N	300	300	300	300
r2	0.974	0.985	0.980	0.984

Note: t statistics in [].

4. Mechanism analysis and verification

First of all, the development of the digital economy includes the process of digital industrialization and

industrial digitization. The updated application of digital technology will directly lead to the continuous growth of the digital economy industry, thereby increasing the tax revenue of the regional digital industry. With the promotion of digital technology, the traditional The industry will also be affected by it, and then optimize its industrial structure and transform into a digital industry, which further increases the tax revenue of the digital industry. Second, the application of digital equipment or digital production methods will cause overall changes in the economic system, and the economies of scope, scale and long-tail economies resulting from the widespread application of digital technologies will directly expand the tax base. With the rise of 5G communication technology, blockchain, artificial intelligence and other technologies, it is bound to have a new impact on the scale of my country's economic development. The establishment of more technology companies will further drive the increase of my country's tax revenue. For the public, The emergence of new technologies will promote public participation, stimulate public consumption, and further expand tax revenue.

This paper takes e-commerce sales as the mechanism variable, and uses the IV-2SLS method to test the mechanism. The results show that the regression coefficient of digital economy development is significantly positive. The existence of the mechanism of tax source cultivation shows that promoting the development of the digital economy is conducive to the development of local e-commerce, promoting the cultivation of tax sources, and thus bringing about a positive effect of improving the efficiency of local fiscal revenue.

Table 5. The mechanism of tax source cultivation.

	(1)	(2)	(3)	(4)
	First stage regression		Second stage regression	
Digeco			0.503***	0.466***
			[12.518]	[10.989]
Post	0.002***	0.002***		
	(11.39)	(16.58)		
Urban		-0.725***		-0.286***
		(-5.44)		[-3.064]
Lngdp		0.097***		0.018*
		(4.98)		[1.786]
Edu		-0.000		0.000
		(-0.15)		[0.842]
Str		-0.000***		-0.000*
		(-0.77)		[-1.747]
Tec		-0.004***		0.001
		(-0.55)		[0.167]
cons	0.527***	0.999***	-0.114***	0.148*
	(17.62)	(7.46)	[-4.688]	[1.697]
Year FE	√	√	√	√
Province FE	√	√	√	√
N	240	240	240	240
r2	0.978	0.986	0.963	0.966

5. Conclusions and policy implications

Based on China's provincial panel data from 2011 to 2020, this paper investigates the effect of digital economy development on local fiscal revenue efficiency. The research conclusions are as follows: First, the development of the digital economy can improve the efficiency of local fiscal revenue, and this conclusion is still valid under the robustness test. Second, the development of the digital economy has an indirect impact on the improvement of local fiscal revenue efficiency. Specifically, the development of the digital economy affects the efficiency of regional fiscal revenue by promoting the cultivation of regional tax sources.

Accordingly, China should accelerate the development of the digital economy and promote the win-win development of the regional digital economy. China should seize the development opportunities brought by the digital economy, strengthen the construction of a new generation of information infrastructure centered on 5G networks, increase investment in technological innovation and research and development, master key core digital technologies, accelerate the cultivation of data element markets and broaden the local tax base. In addition, the country needs to strengthen the development of the endogenous power of the digital economy, conduct dislocation competition based on comparative advantages, and form its own competitive advantages. In addition, strengthen the accuracy of tax incentives for the digital economy industry and promote the transformation of traditional industries. Judging from the current development of China's digital economy, China's taxation is mainly aimed at the field of digital industrialization, and there are not many tax policies for the development of industrial digitalization. Therefore, in the process of digital transformation for traditional industries, the state should give more preferential policies to speed up the transformation and further increase the tax revenue of digital industries.

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Conflict of interest

All the authors claim that the manuscript is completely original. The authors also declare no conflict of interest.

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