Proceedings of CONF-BPS 2026 Symposium: Sustainability Transitions and Regional Economic Restructuring in New Contexts
DOI: 10.54254/2754-1169/2026.NJ31386

A Study on the Impact of Resource Tax Reform on the Economies of Resource-Based Cities

Zhirui Yang

Faculty of Finance, City University of Macau, Macau, China
F21090104731@cityu.edu.mo

Abstract. China's 2016 nationwide resource tax reform marks a significant fiscal restructuring aimed at optimizing resource allocation, promoting green development, and reducing the ecological and economic risks of resource overexploitation. This reform poses increased extraction costs and alters fiscal incentives, creating challenges for resource-based cities that heavily depend on extractive industries, potentially leading to short-term economic contraction. Utilizing panel data from 300 prefecture-level cities covering the period 2008–2021, this study adopts a Difference-in-Differences (DID) approach, designating 118 resource-based cities as the treatment group, to identify the causal effect of the reform on urban economic performance. The findings indicate that the reform significantly constrained economic growth in resource-based cities, resulting in an average decrease of approximately 9,224 RMB in per capita GDP compared with non-resource-based cities. The robustness of causal inference is further corroborated by parallel trend verification and placebo tests. This study offers robust empirical evidence for policy assessment and offers valuable implications for refining resource tax design and advancing the sustainable economic transformation of resource-based cities.

Keywords: DID model, Resource tax reform, Economic growth, Resource-based economy

1. Introduction

In 2016, China implemented a nationwide resource tax reform, the first major fiscal restructuring since 1994. The reform aimed to optimize resource allocation, enhance environmental sustainability, and promote industrial restructuring in resource-dependent regions. By adjusting tax rates, expanding the tax base, and standardizing taxable items, it sought to better reflect resource scarcity and environmental externalities, guiding efficient resource use. Resource-based cities, reliant on mining and energy extraction, face challenges including environmental degradation and low economic diversification. The reform raised extraction costs, curbed over-exploitation, and incentivized industrial upgrading, though short-term slowdowns may occur as traditional sectors contract. A pilot in Hebei on water taxation preceded nationwide implementation. This study analyzes 300 cities from 2008 to 2021 using a Difference-in-Differences model to evaluate the reform's impact on urban economic performance.

DOI: 10.54254/2754-1169/2026.NJ31386

2. Literature review

The impact of tax systems on economic growth represents a crucial topic in the field of public economics. Classical growth theory posits that taxation exerts an impact on macroeconomic growth by affecting investment, savings, and labor supply [1,2]. A well-designed resource tax can optimize resource allocation, while excessive burdens may constrain investment and output. As a levy on natural resource exploitation, it generates fiscal revenue and internalizes environmental costs. Studies show that resource tax reform reflects scarcity and environmental externalities, promoting green growth, though it may temporarily dampen economic activity by raising corporate costs [3,4]. The effectiveness of resource tax reform is contingent upon factors such as tax rate levels and assessment methods [5,6]. The “resource curse” theory postulates that resource-based regions often find themselves trapped in a growth dilemma due to structural homogeneity and insufficient innovation [7,8]. There are numerous resource-based cities across China commonly face economic fluctuations and fiscal pressures following the peak of resource exploitation [9,10]. Some scholars argue that tax policy acts as a key driver of economic transformation. Although resource tax reform can increase development costs, it can also motivate local governments to accelerate industrial upgrading and green transition, thereby improving total factor productivity and fostering sustainable growth [11,12]. This study employs a difference-in-differences method to assess the causal effects of the 2016 resource tax reform on economic growth at the city level, highlighting a gap in existing literature that primarily addresses fiscal and environmental performance.

3. Model specifications

This study employs prefecture-level cities as its research sample, designating resource-based cities as the treatment group and the remaining non-resource-based prefecture-level cities as the control group. A difference-in differences model is constructed to investigate the impact of the 2016 resource tax reform on urban economic development. The model’s original equation is as follows:

$$\mathrm{Y_{it}} = \mathrm{\alpha_0} + \mathrm{\beta_1 Post_t} + \mathrm{\beta_2 Treat_i} + \mathrm{\beta_3 (Post_t \times Treat_i)} + \mathrm{\varepsilon_{it}} \tag{1}$$

Include control variables:

$$Y_{it} = \alpha_0 + \beta_1 Post_t + \beta_2 Treat_i + \beta_3 (Post_t \times Treat_i) + \beta_4 INV + \beta_5 IND + \beta_6 EDU + \beta_7 BUDGET + \beta_8 FIXED + \varepsilon_{it} \tag{2}$$

4. Data sources and processing

This paper employs panel data from prefecture-level cities, sourced from each city’s statistical reports. The specific data description is as follows Table1 and Table2:

DOI: 10.54254/2754-1169/2026.NJ31386

Table 1. Formula data description

Type	Name	Symbol
Dependent Variable	GDP per Capita	Yit
Independent Variable	Interaction Term	Did
Control Variables	Number of foreign-invested Enterprises	INV
	Industrial Enterprises above Designated Size	IND
	Proportion of Education Expenditure	EDU
	Proportion of Local General Public Budget Expenditure	BUDGET
	Proportion of Fixed Asset Investment	FIXED

Table 2. Descriptive statistics table for variables

			Descriptive statistics		
VARIABLES	N	mean	sd	min	max
firstGDP	9,600	17.71	11.51	0.0300	69.26
secondGDP	9,600	45.30	11.89	8.850	91.61
thirdGDP	9,600	37.12	10.11	6.309	83.87
AVEGDP	9,600	26,620	30,909	99	467,749
INV	9,600	76.23	258.7	0	4,773
IND	9,600	1.528	6.556	0.000665	460.3
EDU	9,600	0.0377	0.117	3.49e-05	6.935
BUDGET	9,600	0.202	0.499	0.000610	15.54
FIXED	9,600	0.662	1.028	2.73e-05	17.24

5. Empirical findings and analysis

5.1. Baseline regression

Table 3. Baseline regression results

	Regression Results	
VARIABLES	(1)	(2)
did	-9,224.466***	-8,933.931***
	(-3.73)	(-3.72)
INV		32.637***
		(5.94)
IND		-32.501
		(-0.22)
EDU		33,868.265*
		(1.92)
BUDGET		-10,255.203**
		(-2.54)

DOI: 10.54254/2754-1169/2026.NJ31386

Table 3. (continued)

FIXED		-4,528.386***
		(-4.81)
Constant	27,271.207***	28,602.259***
	(156.19)	(27.25)
Observations	9,600	9,600
R-squared	0.798	0.821

Robust t-statistics in parentheses*** p<0.01, ** p<0.05, * p<0.1

The DID estimator is −9,224.466 (t = −3.73), indicating that per capita GDP in resource-based cities declined significantly after the reform relative to non-resource-based cities. The mechanism operates through higher extraction-stage taxes that raise firms' costs and compress margins, reducing production and investment. Given their single-industry structures and slow upgrading, resource-based cities cannot offset this shock. Subsequent firm contraction lowers employment and household income, weakens consumption, and reinforces the downturn.

5.2. Parallel trend test

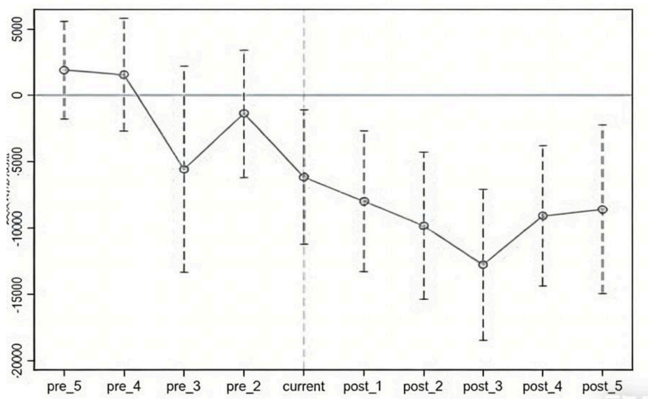

Figure 1. Parallel trend test results

The dynamic effect estimation reveals that before the 2016 tax reform, treatment and control groups had similar per capita GDP trends, meeting the parallel trends assumption for the DID framework. Post-implementation, resource-based cities saw a significant negative deviation of about 9,224 units, with an increasing gap over the years, while non-resource-based cities experienced stable growth. This divergence indicates a negative level effect and growth slowdown, suggesting a credible causal impact of the tax reform.

6. Placebo test

To assess the identification validity of the baseline DID estimates, this study conducts a placebo exercise that keeps the actual policy year fixed while repeatedly assigning a randomly selected subset of provinces as pseudo-treatment units. The reassignment is performed 1,000 times to approximate the distribution of estimates under random allocation. If the placebo coefficients cluster

DOI: 10.54254/2754-1169/2026.NJ31386

around zero without systematic significance, the observed policy effects are unlikely to arise from random variation or unobserved confounders. Figure 2 reports the resulting distribution.

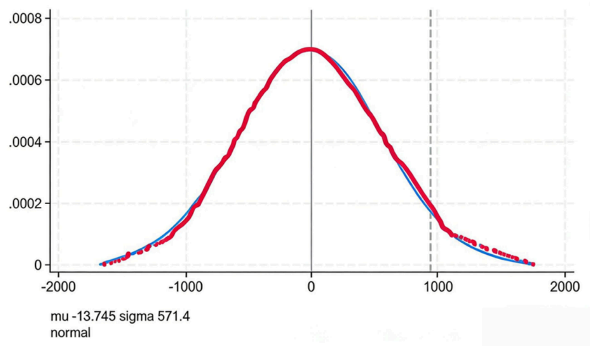

Figure 2. :Placebo test results figure

The figure presents the probability density distribution of the placebo estimates, comparing the results of 1,000 random reassignments with a fitted normal distribution. The simulated coefficients closely follow a normal distribution with a mean of –13.745 and a standard deviation of 571.4, indicating that random allocation does not generate systematic treatment effects. The placebo estimates cluster around zero and aligns well with the theoretical curve, confirming that the pseudo-treatment groups exhibit no significant policy effect.

7. Robustness test

This study also conducted robustness tests by replacing the original dependent 4variable (per capita GDP) with the shares of primary, secondary, and tertiary industries in GDP, yielding the following results:

Table 4. Robustness test results

	Regression Results (Heterogeneity)			
VARIABLES	(1) Per capita gross domestic product	(2) The proportion of primary industry value added in GDP	(3) Secondary industry value-added as a proportion of GDP	(4) The share of the tertiary sector's value added in GDP
did	-8,933.931***	2.027***	-2.010**	-0.040*
	(-3.72)	(2.90)	(-2.36)	(-1.96)
INV	32.637***	0.0000	-0.005***	0.005***
	(5.94)	(0.17)	(-4.98)	(3.89)
IND	-32.501	-0.184**	0.161***	0.0142
	(-0.22)	(-2.08)	(2.56)	(0.36)
EDU	33,868.265*	15.549*	-35.612*	21.469
	(1.92)	(1.56)	(-1.69)	(1.22)
BUDGET	-10,255.203**	-0.205***	0.292	-0.0161
	(-2.54)	(-2.57)	(0.22)	(-0.26)
FIXED	-4,528.386***	-0.334	-4.197*	-0.269

DOI: 10.54254/2754-1169/2026.NJ31386

Table 4. (continued)

	(-4.81)	(-0.33)	(-1.76)	(-4.19)
Constant	28,602.259***	18.072***	45.174***	37.179***
	(27.25)	(43.99)	(131.4)	(162.0)
Observations	9,600	9,600	9,600	9,600
R-squared	0.821	0.785	0.751	0.784

Robust t-statistics in parentheses*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4 results indicate that the 2016 resource tax reform exerted a positive stimulus effect on the primary sector (agriculture, forestry, animal husbandry and fisheries) in resource-based cities, a significant inhibitory effect on the secondary sector (industry and construction), and negligible impact on the tertiary sector (services).

8. Conclusion

This study employs a Difference-in-Differences (DID) approach to assess the impact of the 2016 resource tax reform on economic growth. The reform reduced per capita GDP in resource-based cities by approximately 9,224 yuan relative to non-resource-based cities. This negative effect operates through both direct and indirect channels affecting production, investment, and consumption. Overall, the findings indicate that resource taxation significantly influences economic performance in resource-dependent cities, highlighting the need to balance fiscal, environmental, and growth objectives in policy design.

References

[1] Barro, R. J. (1990). Government spending in a simple model of endogenous growth. ournal of Political Economy, 98(5), 103-125. https: //doi.org/10.1086/261726

[2] Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. The Quarterly Journal of Economics, 107(2), 407-437. https: //doi.org/10.2307/2118477

[3] Song, S. Y., & Luo, C. C. (2025). From "taxes on mountains and marshes" to green taxation: Institutional evolution and functional transformation of resource tax. Taxation Research, 46(3), 45-53. https: //doi.org/10.19376/j.cnki.cn10-1142/f.2025.03.005

[4] Zeng, X. F., Li, G. P., & Li, S. S. (2016). Did the coal resource tax reform reduce enterprise burden? Evidence from surveyed enterprises. Journal of Arid Land Resources and Environment, 30(7), 1-7. https: //doi.org/10.13448/j.cnki.jalre.2016.249

[5] Sun, X., Ren, J., & Wang, Y. (2022). The impact of resource taxation on resource curse: Evidence from Chinese resource tax policy. Resources Policy, 75, 102518. https: //doi.org/10.1016/j.resourpol.2022.102518

[6] Fan, T. (2021). Research on the reform and perfection of resource tax system. Open Journal of Social Sciences, 9(12), 345-353. https: //doi.org/10.4236/jss.2021.912025

[7] Badeed, R., Lean, H. H., & Clark, J. (2016). The evolution of the natural resource curse thesis: A critical literature survey. Working Papers in Economics, (2016-05), 1-32. Retrieved from https: //eprints.keele.ac.uk/3215/

[8] Du, J., Zhang, J., & Li, X. (2020). What is the mechanism of resource dependence and high-quality economic development? An empirical test from China. Sustainability, 12(15), 6234. https: //doi.org/10.3390/su12156234

[9] Zhang, W. Z., & Yu, J. H. (2023). Policy evolution and effect analysis of transformation and development of resource-based cities in China. Journal of Natural Resources, 38(4), 956-972. https: //doi.org/10.31497/zrzyxb.20230412

[10] Miao, C. H., Hu, Z. Q., Geng, F. J., & Miao, J. M. (2018). Economic evolution characteristics and influencing factors of resource-based cities in China: The role of path dependence, vulnerability, and path creation. Geographical Research, 37(8), 1565-1578. https: //doi.org/10.11821/dlyj201808008

DOI: 10.54254/2754-1169/2026.NJ31386

[11] Gao, Z., Zhang, Y., Li, L., & Hao, Y. (2024). Will resource tax reform raise green total factor productivity levels in cities? Evidence from 114 resource-based cities in China. Resources Policy, 85, 103089. https: //doi.org/10.1016/j.resourpol.2024.103089

[12] Yin, Y., & Yang, B. (2023). Environmental protection or development? Multiple policy effects evaluation of the resource tax collection reform for iron ore enterprises in China. International Journal of Environmental Research and Public Health, 20(12), 9876. https: //doi.org/10.3390/ijerph20129876