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The Impact of Local Government Investment on Resource Mismatch

-- From the Perspective of Panel Threshold Regression

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Abstract

Using the macroeconomic data of China's provinces from 2003 to 2018, this article uses a non dynamic panel threshold model to study the impact of local government investment on resource mismatch. The article also discusses the role of local state-owned enterprise dependence and regional heterogeneity. The study found that the impact of local government investment on regional resource mismatch does have a threshold effect. Local government investment can improve resource mismatch under certain circumstances, but when the investment scale breaks through the critical point, local government investment will bring negative effects on resource allocation. The more heavily dependent on local state-owned enterprises for economic development, the more obvious this negative effect is. This article makes repeated regression by changing the core explanatory variables and eliminating the extreme sample values. The results show that the research conclusion of this paper is robust.

Keywords

Local government investment; Resource mismatch; Dependence of state-owned enterprises; Regional heterogeneity.

1. Introduction

The problem of structural resource mismatch caused by non market factors has existed in China for a long time. Over the past few decades, China's economy has achieved total growth at a high rate, but this growth model largely depends on huge resource investment. With the continuous rise of raw material prices and the disappearance of"demographic dividend"the extensive economic growth model must be changed. The 14th five year plan outline document issued by the Chinese State Council in March 2021 clearly put forward the task of "correcting the imbalance and mismatch of resource factors and unblocking the national economic cycle from the source". Resource mismatch has become an important obstacle to the healthy development of China's economy. At the same time, local government investment plays an important role in economic development. The highly centralized planned economic system has seriously constrained the vitality of China's economy and made the efficiency of resource allocation low. After the reform and opening up, the market has gradually occupied a dominant position in resource allocation, greatly alleviating the distortion of the allocation of capital and labor factors. Hsieh and Klenow (2009) did pioneering research on the measurement of resource mismatch. They believe that due to the existence of distorted wedges, the price of production factors is distorted, resulting in the failure of optimal allocation of resources, resulting in resource mismatch. Taking the U.S. economy as a benchmark, the author makes a numerical

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simulation and finds that if China has the same labor and capital allocation efficiency as the United States, China's TFP can increase by 30% - 50%.

2. Research Hypothesis

This paper puts forward the following three research hypotheses:

(1) Hypothesis 1: There is a nonlinear relationship between local government investment and resource mismatch.

When the level of local government investment is within a reasonable range, local investment can improve resource mismatch; When the investment level exceeds a reasonable range, local investment will aggravate the resource mismatch.Due to market failure, local governments can correct market failure to a certain extent by investing in this field. Through the way of"government promotion, enterprise participation and market operation" the problems of investment carrier and capital operation can be solved. The combination of "promising government" and "effective market" enables the local economy to achieve sustainable growth. However, when the level of local government investment exceeds a reasonable range, its negative effects gradually dominate. Too much government led investment will have a crowding out effect on private investment, so as to inhibit the market mechanism from exerting the maximum utility and reduce the investment activity and efficiency to a certain extent. Under the background of political performance evaluation pressure and government credit, it is very likely to have the impulse of over investment. This kind of investment often does not meet the actual public demand, and even there is the abuse of funds and resources, which reduces the efficiency of resource allocation.

(2) Hypothesis 2: The higher dependence of local government economic development on state-owned enterprises, the greater the negative effect of local investment on resource mismatch.

Under the extensive economic development model, in order to pursue unreasonable performance projects, local governments often place their development hopes on state-owned enterprises with absolute scale advantages, and provide state-owned enterprises with lower prices of production factors. In the short term, this strategy can enable state-owned enterprises to collect monopoly income by relying on monopoly advantage and realize rapid scale expansion. However, in the long run, this strategy will undoubtedly lead to the excessive dependence of the local government on the benefits of administrative monopoly, thus aggravating the resource mismatch. The reform of tax sharing system weakens the financial power of local governments, makes significant structural adjustment of fiscal revenue in the budget, and improves the dependence of local governments on the operating income of state-owned capital. Therefore, the higher the dependence of local governments on state-owned enterprises, the greater the negative effect of local investment on resource mismatch.

(3) Hypothesis 3: There is regional heterogeneity in the impact of local government investment on resource mismatch.

Local investment has less space to correct market failure in the economically developed eastern areas, so the investment critical point is low; On the contrary, the central and western regions have a high investment critical point. The impact of local investment on resource mismatch will be affected by the resource endowment, infrastructure construction degree and other factors in different regions. Therefore, it may show some regional heterogeneity, that is, the investment critical point in different regions and the relationship between them before and after the critical point may be different.

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3. Model Setting and Variable Construction

3.1. Model Setting

This paper refers to the non dynamic threshold panel regression model of Hansen (1999). Due to the limited number of samples in this paper, bootstrap is used to repeatedly extract samples to improve the significance test efficiency of threshold effect. This paper sets the following econometric model:

$$\begin{aligned} \mathrm{Disa}_{it} = \alpha_0 + \alpha_1 \mathrm{invest}_{it-1} \cdot \mathrm{I}(\mathrm{invest} \leqslant \mathrm{invest}^*) + \alpha_2 \mathrm{invest}_{it-1} \cdot \mathrm{I} \\ (\mathrm{invest} > \mathrm{invest}^*) + \ \mathrm{X'}_{it-1} \cdot \gamma + \mu_{it} \end{aligned} \tag{1}$$

Where, $Disa$ represents the degree of resource mismatch; invest represents local government investment; i is the province and t is the year; $\mathrm{X'}_{it}$ represents the control variable vector. I represents the exponential function, 5 takes 1 at 6, otherwise 0; Take 1 at 7, otherwise take 0. 8 and 9 respectively indicate the impact of local government investment below and above the critical point on resource mismatch. In order to eliminate the interference of the explanatory variable on the reverse influence of the explanatory variable as far as possible, all explanatory variables in this paper are treated with one-stage lag.

3.2. Variable and Data Description

3.2.1. Explained Variable

This paper uses the resource mismatch index to measure the degree of distortion of capital and labor factors in various regions of China, and with reference to the methods of Chen (2011), quantifies the resource mismatch into capital mismatch index (DisaK) and labor mismatch index (DisaL)as follows:

$$\gamma_{\mathrm{Ki}} = \frac{1}{1+\mathrm{Disa}_{\mathrm{Ki}}}; \ \gamma_{\mathrm{Li}} = \frac{1}{1+\mathrm{Disa}_{\mathrm{LI}}} \tag{2}$$

Among them, 1 and 2 represent the absolute distortion coefficient of elements, but they cannot be measured in practical work. This paper uses the practice of Cui Shuhui et al. (2019) to use relative distortion coefficients 3 and 4 instead of calculation 5:

$$\hat{\Upsilon}_{Ki} = \left(\frac{K_i}{K}\right) / \left(\frac{s_i \beta_{Ki}}{\beta_K}\right); \ \hat{\Upsilon}_{Li} = \left(\frac{L_i}{L}\right) / \left(\frac{s_i \beta_{Li}}{\beta_L}\right) \tag{3}$$

Where K represents capital factor, L represents labor factor, $\mathrm{S_i} = (\mathrm{y_i}/\mathrm{Y})$ represents the share of regional output in the whole economic output, β represents factor output elasticity, and $\beta_{\mathrm{K}} = \sum_{\mathrm{i}}^{\mathrm{N}} \mathrm{s_i}\beta_{\mathrm{Ki}}$ represents the capital contribution weighted by output. K_i/K represents the actual proportion of i regional capital used in the total capital; $s_i\beta_{Ki}/\beta_K$ measures the theoretical proportion of regional capital used in the effective allocation of capital. The ratio of the two can reflect the mismatch degree of regional capital used: if $\hat{\Upsilon}_{Ki}$ is greater than 1, it indicates that the cost of capital use in the region is relatively low and the capital allocation is excessive; Conversely, if $\hat{\Upsilon}_{Ki}$ is less than 1, it indicates insufficient capital allocation. Similarly, the relative distortion coefficient of labor factors can be obtained.

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3.2.2. Core Explanatory Variable

Measurement of local government investment. This paper adopts the approach of Zhang (2010), and takes the financial expenditure in the government budget after deducting the expenditure of science, education, culture and health as a proxy variable to represent the investment of local government.

3.2.3. Control Variable

This paper selects the following control variables: degree of economic development (GDP), which is described by the natural logarithm of per capita GDP of each province. Industrial structure, this paper uses the proportion of the added value of the secondary industry in GDP to measure the industrial structure. Trade openness is measured by the proportion of total import and export of each province in GDP.Foreign capital dependence (FDI), measured by the proportion of foreign direct investment in GDP.Urbanization rate (urban) is measured by the ratio of urban resident population to total resident population. Local SOE dependency level (SOE), using the proportion of the output value of state-owned and state-controlled industrial enterprises in each province in GDP as an alternative variable.

Table 1. Descriptive statistics of main variables

		Mean	standard deviation	Maximum	minimum value	Number of samples
Υ_K	Capital mismatch index	1.246	0.053	1.523	0.505	464
Υ_L	Labor mismatch index	1.423	0.072	1.689	0.629	464
invest	Proportion of local government investment in GDP	0.142	0.056	0.235	0.093	464
GDP	Natural logarithm of per capita GDP	2.036	0.041	2.301	1.948	464
structure	Proportion of added value of secondary industry in GDP	0.359	0.057	0.409	0.267	464
Trade	Proportion of import and export trade in GDP	0.224	0.044	0.244	0.106	464
FDI	Proportion of foreign capital in GDP	0.015	0.009	0.054	0.008	464
Urban	Urbanization rate	0.364	0.144	0.557	0.259	464
SOE	Proportion of output value of state-owned industrial enterprises in GDP	0.321	0.035	0.401	0.220	464

4. Regression Result Analysis

4.1. Threshold Effect Test

This paper first tests the threshold type to explore the specific setting form of the threshold model, and reports the estimation results in Table 2. It can be seen from the data in the table that the single threshold effect of the national sample is significant, and the effects of double threshold and three threshold are not significant.

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Table 2. Threshold effect test of the impact of local government investment on resource mismatch

region	Threshold type	F Value	P Value	critical value		
				1%	5%	10%
Whole country	H1: Single threshold	27.470***	0.002	25.228	18.725	12.735
	H2: Double threshold	5.849	0.257	23.078	13.208	10.684
	H3: Triple threshold	6.393	0.393	21.196	13.661	9.813

Note: *, * * and * * * are significant at the level of 10%, 5% and 1% respectively.

After the threshold condition test, it is necessary to identify the threshold value in the threshold model. Hansen (1999) proposed using maximum likelihood estimator (LR1) to test the threshold. According to Hansen's research results, this paper obtains the threshold and its 95% confidence interval with the help of the above method, as shown in Table 3 below:

Table 3. Threshold estimation results

	Threshold model	Threshold estimate	95% confidence interval
Whole level	Single threshold model	0.139	[0.137, 0.142]

Table 4. Threshold model regression results of local government investment on resource mismatch

variable	Capital mismatch		Labor mismatch	
	(1) Benchmark results	(2) Dependence of state-owned enterprises	(1) Benchmark results	(2) Dependence of state-owned enterprises
L.invest_1	-0.150**	-0.164**	-0.184***	-0.092***
	(-2.189)	(-2.378)	(-3.216)	(-3.258)
L.invest_2	0.102**	0.137*	0.153*	0.151**
	(2.431)	(1.840)	(1.817)	(2.128)
L.GDP	-0.042**	-0.231**	-0.219**	-0.213**
	(-2.013)	(-2.438)	(-2.150)	(-2.617)
L.structure	-0.133	-0.152*	-0.240	-0.371**
	(-0.125)	(-1.903)	(-0.507)	(-2.136)
L.trade	0.156***	0.035*	0.022***	0.203
	(3.128)	(1.803)	(4.253)	(0.430)
L.FDI	0.174**	0.215**	-0.378	-0.209**
	(2.332)	(2.369)	(-0.267)	(-2.218)
L.urban	-0.167*	-0.292***	-0.371**	-0.203**
	(-1.702)	(-4.138)	(-2.103)	(-2.159)
L.SOE	0.231**	0.254**	0.329	0.230**
	(2.183)	(2.421)	(0.460)	(2.315)
L.invest_1*SOE		-0.054***		-0.039**
		(-4.230)		(-2.135)
L.invest_2*SOE		0.390**		0.280**
		(2.252)		(2.170)
Constant	0.050	0.034**	0.047	0.076
	(0.342)	(2.274)	(0.029)	(0.632)
R-squared	0.514	0.695	0.532	0.673

Note: the values in brackets are t values, *, * * and * * * respectively indicate significant at the levels of 10%, 5% and 1%.

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4.2. Model Estimation Results

Based on the results of threshold effect test and threshold estimation, the panel threshold model set in this paper is estimated. Among them, local government investment is taken as the threshold variable and the main explanatory variable, and the resource mismatch index is taken as the explanatory variable. The parameter estimation results are shown in Table 4:

Model (1) lists the benchmark regression results when all control variables are added, from which it can be found that: first, when within the critical value level, the coefficient of investment variable is significantly negative, and the improvement effect on capital mismatch is 0.150, and the improvement effect on labor mismatch is 0.184. This result shows that in some areas with insufficient investment, local governments have played an indispensable role in improving resource allocation by carrying out infrastructure construction, supporting the development of local enterprises, and investing and managing local enterprises. Secondly, when the critical level is exceeded. The coefficient of investment variable is significantly positive, indicating that excessive local government investment intensifies the resource mismatch. The deterioration effect of capital mismatch is 0.102 and that of labor mismatch is 0.153. Hypothesis 1 is verified.

Model (2) verifies hypothesis 2 by introducing the cross term variable of local government investment and local state-owned enterprises. It can be seen that the coefficient of l.invest-1 * SOE variable is significantly negative in capital mismatch and labor mismatch, with the sizes of -0.054 and -0.039 respectively, both of which are smaller than the l.invest-1 coefficients (- 0.164) and (- 0.092) in model (2), This phenomenon shows that within the critical level of investment, although local government investment still has an improvement effect on resource mismatch, the dependence on local state-owned enterprises reduces the degree of improvement. The coefficients of l.invest-2 * SOE variable in model (2) capital mismatch and labor mismatch are significantly positive, and the values are greater than the l.invest-2 coefficient in model (2). The results show that the more dependent economic development is on state-owned enterprises, the greater the negative impact of local government investment on resource mismatch. So far, hypothesis 2 has been effectively verified.

5. Conclusions and Policy Recommendations

Firstly, the over investment of local governments will have a negative impact on resource allocation. In the process of economic structure transformation, the most important task of the government is to create a good market competition environment and let the market play a decisive role in resource allocation. Only when there is market failure or insufficient investment in some public goods, the government should intervene appropriately. Secondly, the economic dependence of local governments on state-owned enterprises may further aggravate the regional resource mismatch. In order to improve the local GDP and employment level, local governments will be motivated to increase subsidies and preferential policies for state-owned enterprises, thus affecting the allocation of resources. Finally, since the founding of new China, although great achievements have been made in the process of economic and social construction, there are still some problems. Only by deepening the reform of factor market and establishing a multi-level competitive and integrated system can we make the allocation of production factor resources more effective. In addition, the current scale of government investment should be appropriately adjusted. Government investment can only be used as a supplement to the investment of market subjects, and the reform should be deepened in the direction that the government gradually gives way to the market.

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