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Research on the Regional Difference of the Economic Effect of Chinese Public Investment

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Abstract: The panel data of the Chinese 31 provinces, autonomous regions and municipalities directly under the central government in 1995-2011 are used to build dynamic panel data model to investigate the influence of the Chinese local government's public investment on regional economic growth in this studay. And the research shows that since 1995 the Chinese local government's public investment has promoted the regional economic growth but the effects of different public investment projects in different regions show big differences. Some improvement opinions are put forward in the end of the studay.

Key words: Public investment, regional economy, local government

INTRODUCTION

In recent years, Chinese scholars have researched Chinese regional growth effect of public investment. And most believe that public investment has a growth effect to regional economy. But there are differences about this kind of effect among different areas. So there are different conclusions about which region gets the most obvious growth effect by public investment (Wang *et al*., 2012). Some researches show that the western region of China gets the biggest positive influence from public investment in the meanwhile the central region follows and the eastern region gets the smallest. And some show that the effect of economic growth in different areas should have obvious differences and the effect of public investment in the western region should be significantly lower than the effect in the eastern and central regions (Cui, 2012).

This study uses the relevant data of the expenditure of public investment of Chinese local governments since, the reform of tax allocation in 1995 to analyze the influence of the public investment of the Chinese local governments to the regional economic growth, research the behavior tendency of the local governments and discuss the deep reasons of the unreasonable present Chinese public investment.

DATA AND INSTRUCTIONS

Generally speaking, the local government public investment refers to the public expenditure which occurs in the process of providing public goods or services to the local residents by the local government and is commonly expressed as the productive cost of the financial expenditure. According to the local fiscal budget statement and considering the availability of the data, this study mainly uses the sum of four kinds of expenditures such like the capital construction expenditure, the enterprise development expenditure, the rural production and business supporting expenditure and the culture, education, science and health expenditure which come from the local fiscal expenditure to reflect the sum of the local government public investment (Ma and Zhang, 2013).

The data of this studay comes from the new China 55 years statistical data collection and the China statistical yearbook, China financial yearbook, China statistical yearbook of investment in fixed assets, China's regional economy yearbook, etc., of the related years. And the relevant data of the local public investment is disposed and calculated according to the relevant panel data of the Chinese 31 provinces, autonomous regions and municipalities directly under the central government in 1995-2011.

ECONOMETRIC MODEL

Econometric model: The dynamic panel data model is built based on the Felix's classical economic growth model by using the data of the national 31 provinces, autonomous regions and municipalities directly under the central government to econometrically analyze the relationship between the all kinds of local public investment and the regional economic growth. This method is to control the cumulative effect of public investment by adding the lag phase of dependent variable to the regression control variable.

Table 1: Regression results of local public investment effects of regional economic growth

	Dependent variables Output per capita			
Independent variables	Whole Eastern (1)	Central Western (2)	Country Region (3)	Region Region (4)
ln y_{it-1}	0.6416***	0.6735***	0.5812***	0.7023***
	(0.0489)	(0.0218)	(0.0461)	(0.0533)
ln f c_{it}	0.0311**	0.0457**	0.0338***	0.0379***
	(0.0146)	(0.0290)	(0.0161)	(0.0130)
ln f e_{it}	0.0408***	-0.0519**	0.0035 0.0441***	
	(0.0132)	(0.0256)	(0.0031)	(0.0233)
ln f r_{it}	-0.0008	0.0027*	0.0035	-0.0067
	(0.0015)	(0.0024)	(0.0031)	(0.0054)
ln f s_{it}	0.0079	0.0145***	0.0028	-0.0030
	(0.0057)	(0.0106)	(0.0023)	(0.0025)
D_e	0.2278**	-	-	-
	(0.1183)	-	-	-
D_w	-0.2135	-	-	-
	(0.1398)	-	-	-
Constant term	0.0607***	0.0634***	0.1887	-0.4193
	(0.0142)	(0.0223)	(0.6526)	(0.3085)
m_2	-0.936	-0.9792	-0.942	-0.9786
	[0.415]	[0.2816]	[0.3853]	[0.3994]
Sargan test	[0.9871]	[0.9769]	[0.9852]	[0.9931]
No. of observations	385	127	98	145

Annotation: * * * * * *, * *, * respectively signify to be significant in the level of 1%, 5% and 10%. The data in ( ) signify the standard deviation. The data in [ ] signify the p values. The Sargan statistic is used to test whether there is too much recognition in the torque condition under the condition of the same variance assumption. The difference GMM instrumental variables are presumed to be right and the p values is reported in the table. The m_2 is the test statistics of Arellano-Bond AR (2) which is used to inspect if there is a second order autocorrelation in the first difference residual error sequence and it is presumed to be without autocorrelation. Equation (1) sets two virtual variables such as D_e and D_w for the eastern and western regions based on the central region

$$\ln y_{it} = \alpha_0+\alpha_1 \ln y_{it-1}+\alpha_2 \ln f c_{it}+\alpha_3 \ln f e_{it}+\alpha_4 \ln f r_{it}+\alpha á_5 \ln f s_{it}+c_i+u_{it}$$

The t year of logarithm of per capita gross national product of province i is signified as ln y_{it}. The lag item for one period is signified as ln y_{it-1}. The every region's financial spending targets of the business of the capital construction expenditure, the enterprise development expenditure, the rural production and business supporting expenditure and the culture, education, science and health expenditure are signified as ln f c_{it}, ln f e_{it}, ln f r_{it}, ln f s_{it}. They are signified by the logarithm of the every region's per capita spending. The individual heterogeneity which is usually caused by the unobserved factors in certain province, city or autonomous region and includes the influence of the transfer payment from the central government to the provinces, autonomous regions and municipalities directly under the central government is signified as c_i. The random error term is signified as u_{it} and its expected value is assumed as zero without serial correlation (Xu and Yang, 2006).

Estimation method: The lag item of the dependent variable of the dynamic panel data model appears on the right side of the equation. It might cause endogenous problems (ln y_{it-1} will be associated with u_{it} as long as s < t) on the one hand and lead error term to exist in the moving average process on the other hand. Therefore, traditionally relying on a fixed effect or random effect model of OLS regression will cause the biased estimated coefficients.

System generalized method of moment could be used to solve this problem. The estimates could be preceded by using the dependent variable lag item of the t-2 period and the dependent variable of the first order differential lag item as the instrumental variable of the dependent variable lag item. The consistent and more effective estimation results can be got by using the econometric software STATA 11.0.

Estimation results: By using the above methods, the estimation results of the leverage of local public investment to regional economic growth are shown in Table 1. The estimation results in Table 1 show that the leverage of the per capita output lag items (ln y_{it-1}) is larger. That mines Chinese per capita output has obvious cumulative effect.

The coefficients of the public investment's economic construction item of expenditure all have significant feature. That means the economy of spending impacts on the regional economic growth significantly, but the role of each kind of expenditure on economic growth is not the same:

- The basic construction expenditure (ln f c_{it}) has an obvious role in promoting the economic growth of

the three regions. But the impact strength is not the same. The biggest influence is in the east region, followed by the western region, and the central region gets the minimum. That shows a tendency of central excessive penetration. The local governments of the eastern region promote the regional economic growth obviously because they have strong public investment capacity and provide relatively perfect infrastructure. But the local governments of the central and western regions have weak public investment capacities and the regional infrastructures are relatively insufficient (Zhang *et al*., 2012). That is not conducive to the inflow and accumulation of production factors. So the regional economic growth is relatively slower

- The enterprise development expenditure ($\ln f e_{it}$) on the role of the three regions' economic growth is also not the same. The pulling effect is most obvious to the west region and the eastern region gets a negative effect. There was no significant role for the central region. This conclusion shows that if the regions of China get the higher degree of marketization, the likelihood of the government expenditures to distort the market mechanism is greater (Sun, 2012)
- The estimated coefficients of the rural production and business supporting expenditure ($\ln f r_{it}$) of the three regions are all not significant which means its pull effect on regional economic growth is not obvious. This reflects the preference of the local governments in China to put the limited resources on the infrastructure construction which brings in quick economic growth in order to improve the local regions' economy rapidly. And the agricultural input is relatively shorter because of its longer production cycle and lower efficiency
- The effect of the culture, education, science and health expenditure ($\ln f s_{it}$) in the public investment on the three regional economic growth is not the same. The pulling effect on the eastern region is most obvious. And there is no significant influence on the central and western regions. The reason is that the local governments in the eastern region pay more attention to the human capital investment and improve the labor efficiency (Wang and Zhang, 2012). So its pulling effect on economic growth is relatively more obvious

CONCLUSION

The above studies have shown that the public investment of Chinese local governments promoted the regional economic growth as a whole in recent years. But the pulling effects of different investment projects have big differences among different regions. That is why the following policy suggestions are put forward. First of all, the local government functions should be transformed and the reform of investment system should be deepened. profitability should be reduced as far as possible. On the other hand, the public investment should be invested to the public domain of service which is necessary for the western regions, the local governments should increase On the one hand, the investment activities with economic development and social progress. Secondly, the regional structure of local government public investment should be optimized. For the under-development central and the investment of the economical projects such as infrastructure and enterprise technology upgrade energetically. For the eastern region, the local government should increase the investment in the social projects such as the science, education and health care.

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