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PUBLIC GOODS PROVISION IN RURAL AREA: CASE FROM ZHEJIANGPROVINCE OF CHINA

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1. INTRODUCTION

Rural public goods are relatively wide concept in economics. Samuelson defined pure public good to be one that is both non-rivalries and non-excludable. Private provision of pure public good is efficient because people are able to free ride. Generally, rural public goods can be divided into two categories: one is public consumption goods and public factors of production. In China, in terms of categories of Ministry of Finance, public expenditure consists of over 20 items, including expenditure for capital construction, innovation funds and science and technology promotion funds, expenditure for supporting agricultural production, expenditure for pension and social welfare, expenses on culture education science and public health, administrative expenses, expenditure for national defence, etc.

This paper focuses expenditure for supporting agricultural production in Zhejiang Province, estimating the linkage between agricultural output and public good provision and the role of government expenditure.

It consists of five sections. A brief status of Zhejiang province in China is the subject of the next section. Section 3 is Model and Econometric analysis. Section 4 provides marginal production of supporting to agriculture from government. Conclusions and policy implications section highlights the major findings of this paper and gives some suggestions.

2. THE BRIEF STATUS OF ZHEJIANG PROVINCE IN CHINA

Since opening and reform in 1978, China has experienced great success and achievement. Average growth rate of economy in recent decades is above 9%. And

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Farmers' income increased very rapidly since 1978.Per capita income of rural households was 2936 RMB in 2004, while it was 134 RMB in 1978. Since 1978, share of agriculture in GDP is decreasing; the contribution rate to economy is 14%. Agriculture is also important income source for Farmers' income in rural area, 45% of farmers' income came from agriculture in 2004. Zhejiang province is located at the east coastal region of China, as one of the most economically vibrant and developed provinces, Zhejiang ranked the fourth in China in terms of overall economic aggregate. The percentage of added value from the primary, secondary and tertiary industries were 6.6%, 53.4%,40% respectively, which is quite more developed area in China. The income per capita of rural households was 6096 RMB in 2004, which is about 2 times of average income per capita of rural households. However, distinctive dual economic structure exits all the time. By income, annual disposable income per capita of urban household is exceeding 3 times of rural households, while in the beginning of opening and reform, for example, the former income was 343 RMB and latter was 134 RMB, which is about 2.5 times of income gap.

As to the Financial Expenditure of local government, share of supporting Agricultural Production is 6.8% in 2005, Government Administration expense is 11%. Education expenditure is about 18%.

In order to indicate the role of public good to agriculture and income in Zhejiang province, and considering the item of Supporting Agricultural Production in public finance expenditure is related to agriculture production, we introduce it to examining the correlation between public expenditure and economic growth and calculate the marginal production of Supporting Agricultural Production.

3. MODEL AND ECONOMETRIC ANALYSIS

3.1 Model

From the theory of Economic Growth, capital, labour and technology are directly affecting economic growth. One common model is Cobb-Douglas Functions; therefore it is adopted to analyze the effect of public good. Meantime we estimate sharing-tax system effect on agriculture.

Three variables are introduced in this function: expenditure for supporting agricultural production represents the input of capital, numbers of employee represents input of labour, and production per unit represents the technology.

The Cobb-Douglas Functions can be written in linear equation, which is as follows:

(1) $\ln Y = \alpha + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \varepsilon$ (Model A)

where Y is output of agriculture;

β is regression coefficient;

X_1 is input of labour per year

X_2 is input of expenditure for supporting agricultural production

X_3 is level of technology

ε is Residual

Considering the institutional factor, we set a Dummy variable, we have

(2) $\ln Y = \alpha + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \text{Dummy(s)} + \varepsilon$ (Model B)

Dummy variable value equals 1 during 1994-2004, and it is valued 0 during 1978-1993, because sharing –tax system is implemented since 1994.

3.2 Data and empirical results

Time series data all are collected from Zhejiang statistic year book and China statistic year book, the value data are deflated by Retail price index. Gross output value includes agriculture, forestry, husbandry and fishery. Technology is substituted by grain output per unit.

We use Ordinary Least Squares method to estimate the functions. The empirical results are given in Table 2 and Table 3.

From results of regression of Model A, obviously, it fits well. Adjusted R-squared is 0.975, F=340, which show variables can explain depend variable very well in this model. D.W >1.5, means that it has no autocorrelation.

Variable Labour is significant at the 5% level; Variable Technology is significant at the 5% level, too. Expenditure for supporting agriculture shows significant at 0.1%.Although all of the explanatory factors are statistically significant

determinants of output of agriculture, they have different coefficient. Production elasticity of labour is 0.482, indicating increase 1% of labour will improve output of agriculture 0.482%; and Expenditure for supporting agriculture is positive to output of agriculture, elasticity indicates increase 1% of expenses for agriculture from government will improve output of agriculture 0.36%, elasticity of technology indicates increase 1% of technology will improve output of agriculture 0.619%.

Table 1 Regression of Model A

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Labour	0.482	0.176	2.738	0.012
Expenditure for supporting agriculture	0.360	0.028	12.852	0.000
Technology	0.619	0.272	2.274	0.032
Constant	-3.393	2.574	-1.318	0.200
R-squared	0.978	Mean dependent var		6.087
Adjusted R-squared	0.975	S.D. dependent var		0.397
Log likelihood	38.606	F-statistic		340.057
Durbin-Watson stat	1.772	Prob (F-statistic)		0.000

In model B, we add a policy variable; China began to implement sharing-tax system since 1994. It's important reform for public finance system. According the system, two sets of tax system are established, and central government and Local governments have their own responsibilities. Local governments governing primarily agricultural, particularly grain-based, economy are more revenue-starved than those with large non-agricultural sectors deriving revenues mainly from business tax and value-added tax (YU Qing, 2005). We want to estimate whether the policy is positive to output of agriculture in Zhejiang Province.

From Table 2, it also fits well, and Adjusted R-squared is 0.98, F=278, which show variables can explain depend variable very well in this model. D.W =1.879, means that it has no autocorrelation.

Table 2 Regression of Model B

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Labour	0.588	0.179	3.2754	0.003
Expenditure for supporting agriculture	0.332	0.030	10.753	0.000
Technology	0.692	0.264	2.617532	0.015
Policy Dummy	0.086	0.049	1.731919	0.097
C	-4.743	2.588	-1.832205	0.080
R-squared	0.980	Mean dependent var		6.087
Adjusted R-squared	0.977	S.D. dependent var		0.397
Log likelihood	40.332	F-statistic		277.966
Durbin-Watson stat	1.879	Prob (F-statistic)		0.000

Variable Labour is statistically significant at the 1% level, it's better than former function; Variable Technology is statistically significant at the 5% level. Expenditure for supporting agriculture shows statistically significant at 0.1%. Meantime all of the Explanatory factors are statistically significant determinants of output of agriculture, they have different coefficient. production elasticity of labour is 0.588, indicating increase 1% of labour will improve output of agriculture 0.588%; and Expenditure for supporting agriculture is positive to output of agriculture, elasticity indicates increase 1% of expenses for agriculture from government will improve output of agriculture 0.332%, elasticity of technology indicates increase 1% of technology will improve output of agriculture 0.692%. Concerning the policy factor, it is statistically significant at 10% level, and it is positive to output of agriculture, but the effect is quite little, the elasticity is 0.086.Maybe some provinces show negative role because sharing-tax system reform, they didn't put more money into agriculture because of fiscal budget, while Zhejiang province is quite more richer and can put more financial support to agriculture, but this hypothesis needs further research to examine.

4. MARGINAL PRODUCTION OF SUPPORTING TO AGRICULTURE FROM GOVERNMENT

According to Barro (1990), the best scale of public expenditure can be reached if MPG (marginal production of government expenditure) equals 1. That is to say, Marginal cost equals marginal revenue, then the best point exits; otherwise, we should reduce the budget or increases budget. From production function, we can draw formula of government expenditure elasticity as follows:

$$\beta = \frac{\partial Y}{\partial G}\frac{G}{Y}$$

β is elasticity

Y is output of agriculture

G is Expenditure for supporting agriculture

$\frac{\partial Y}{\partial G}$ is marginal production of government expenditure

Recalling model B, we can get elasticity of Expenditure for supporting agriculture, therefore we can get MPG during 1978 to 2004.

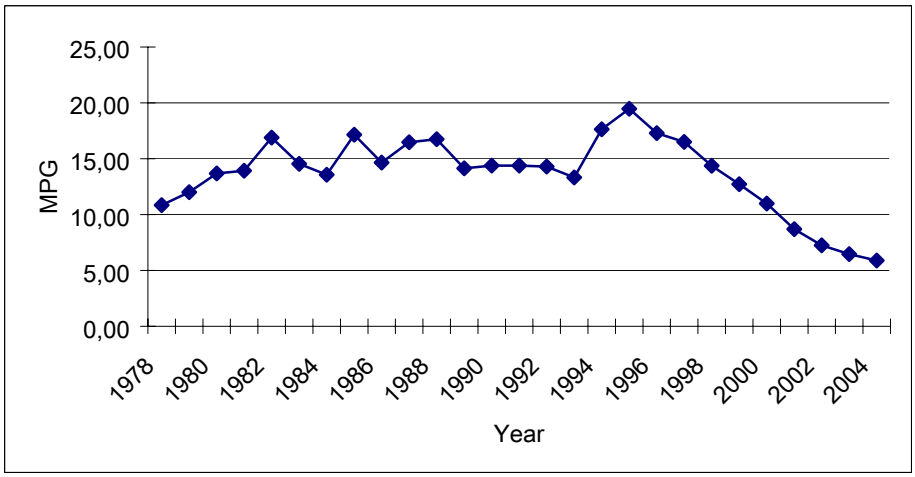

Figure 1 MPG of Zhejiang

It shows basic situation of MPG from Figure 1, indicating the tendency is decreasing since 1996, while it is swinging during the time from 1978 to 1995. However, all MPG are exceeding 1, that means we still didn't get the proper scale and need to invest more money into agriculture. Why MPG is decreasing? If the elasticity is constant, MPG is decided by percentage of government expenditure to the value of agricultural output. Therefore, the percentage is enlarging in recent years.

5. CONCLUSIONS AND POLICY IMPLICATIONS:

Based on the analytical model, this paper examines the linkage between Expenditure for supporting agriculture and output of agriculture, we also examine whether the sharing-tax system does benefit to agriculture, and calculate MPG from 1978 to 2004.

The empirical results indicate that among all these statistically significant factors.

Labour and technology and Expenditure for supporting agriculture are the three important variables that affect output of agriculture. Other factor such as policy also plays a role in some degree, and the marginal production of government expenses to agriculture is exceeding 1. One policy implication of this finding is that government should pay more attention to the role of government expenses to agriculture, it can increase output of agriculture and improve income of farmers' income, and then it will shrink the gap between urban area and rural area. So far, we still didn't get close to the best scale level, and government should enlarge the amount of expenditure to agriculture, especially enlarging the production expenditure, which is permitted by regulation of WTO; Second implication is that government should encourage more private and public money to agricultural technology, which obviously benefits to agriculture. All these measures will do helpful to farmers' income and rural development.

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