PUBLIC SPENDING AND RURAL POVERTY IN INDONESIA

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ABSTRACT

Indonesia has achieved relatively high economic growth from 1960 until 1997 just before the crisis. During the crisis, the most affected area was the rural area. In 1999, people living under the poverty line in the rural area increased to 26 percent, this number was higher compared to urban area which was 19.4 percent. Public spending has a crucial role in the poverty reduction. The objective of this paper is to investigate the role of public spending, especially agricultural research and development, education and health, in reducing the poverty in Indonesia, especially in the rural area. The result showed that in order to decrease rural poverty the government must focus its effort in increasing TFP by improving literacy rate. Increasing government expenditure on agricultural research will have no effect on rural poverty; meanwhile increasing government expenditure on education will have more effect in increasing agricultural wage rather than non-agricultural wage.

Keywords: rural poverty and public spending

INTRODUCTION

Indonesia has achieved relatively high economic growth during the 1960's until 1997 just before the crisis. The economy has grown 6.4 percent annually from 1960 to 1997. In terms of GDP per capita, it has also increased from US$ 178 in 1960 to US$ 825 in 1997 (World Development Indicator, 2005). This rapid growth led to reduction in poverty. In 1976, 40.1 percent of the total population lived under the poverty line; meanwhile in 1996 the number decrease into 11.34 percent. One of the reasons of the decrease in the poverty is the public spending by the government. This public spending includes education, health, agricultural etc.

Indonesia's population is mainly live in the rural area although the number has decreased significantly over the years. In 1961 almost 85 percent of the total population lives in the rural area; meanwhile in 2003 the number has decreased into 54 percent only.

During the crisis, the most affected area is the rural area. In 1999, people living under the poverty line in the rural area increase to 26 percent, this number is higher compare to urban area which is 19.4 percent. People living in rural areas are more vulnerable especially to the increase in food price. When the food price rocketed, they can not afford anymore to buy foods. The number of people living under the poverty line in Indonesia is summarized in Table 1.

Table 1. Number and Percentage of Poor People by Urban-Rural Areas in Indonesia

Year	Number of Poor People (million)			% Poor People (Headcount Index)		
	Urban	Rural	Total	Urban	Rural	Total
1976	10.0	44.2	54.2	38.79	40.37	40.08
1978	8.3	38.9	47.2	30.84	33.38	33.31
1980	9.5	32.8	42.3	29.04	28.42	28.56
1981	9.3	31.3	40.6	28.06	26.49	26.85
1984	9.3	25.7	35.0	23.14	21.18	21.64
1987	9.7	20.3	30.0	20.14	16.14	17.42
1990	9.4	17.8	27.2	16.75	14.33	15.08
1993	8.7	17.2	25.9	13.45	13.79	13.67
1996	7.2	15.3	22.5	9.71	12.30	11.34
1998	17.3	31.4	48.7	21.56	25.27	23.81
1999	15.6	32.3	47.9	19.4	26.0	23.4
2002	13.3	25.1	38.4	14.5	21.1	18.2
2003	12.2	25.1	37.3	13.6	20.2	17.4
2004	11.4	24.7	36.1	12.1	20.0	16.7

Source: Statistics Indonesia in Maksum (2004)

OBJECTIVE

Public spending has a crucial role in the poverty reduction. The objective of this paper is to investigate the role of public spending, especially agricultural research and development, education and health, in reducing the poverty in the rural area in Indonesia. Rural area is chosen since the incidence of poverty is higher in rural areas than in the urban areas in Indonesia.

LITERATURE REVIEW

Several studies have been conducted on the effect of public spending on the rural poverty. Fan, Hazell and Thorat (2000) estimated the direct and indirect effect of different types of government expenditure on rural poverty and productivity growth in India. The authors used simultaneous equation to solve the problems. The results indicate that in order to reduce rural poverty, the Indian government should give highest priority to additional investments in rural roads and agricultural research.

Fan and Zhang (2004) analyze the link between reforms, investment and poverty in rural China. The study shows that government spending on investment that enhance investment such as agricultural research and development, irrigation, rural education and infrastructure has a role in increasing agricultural productivity and reducing rural poverty. The similar result also found by Fan, Jitsuchon and Methakunnavut (2004) in the case of Thailand and Fan, Zhang and Rao (2004) in the case of Uganda.

In the case of Indonesia, Gemma (2005) analyzes the effect of public spending on the rural poverty. The result shows that the spending on transportation system can reduce rural poverty through making better access to input materials and output markets, information on available technology and labor markets in rural and urban areas. These can cause an increase in income for the rural households.

In addition, Yudhoyono (2004) in his study discusses the effect of fiscal policy on poverty and unemployment through agriculture and rural development. The study shows that increase in government spending in agriculture will increase GDP, hence will cause the labor demand to increase and decreasing the unemployment proportion by 4.9 percent. This increase in GDP and unemplyment at the end will decrease urban and rural poverty by 0.6 and 0.7 percent respectively.

MODEL

In determining the effect of public investment to rural poverty, four equations were constructed. The first equation determines the factors that affect rural poverty, the model is as follows:

(1) $P = f(TFP, W, NW, P_{t-1})$

Equation (1) models the determinant of rural poverty (P), which is defined as the percentage of rural population living below the poverty line. The determinants are growth in total factor productivity (TFP), agricultural wage (W), non-agricultural wage (NW) and lagged poverty (P_{t-1})

Total factor productivity (TFP) shows the measure of the collective contribution of non-conventional input in agriculture, for example improvement in input quality, market access, economies of scale and technology (Alston et.al, 1995 in Fuglie, 2004). TFP is used to capture the effect of technology driven shift which change the production function on rural poverty (Fan, Hazell and Thorat, 2000). Agricultural wages (W) and non-agricultural wages (NW) are included in the model because the variables are the important source of rural income household.

The second equation explains the determinants of total factor productivity (TFP) growth. The function is as follows:

(2) $TFP = f(GRD, LR, TFP_{t-1})$

The determinants of TFP are stock government expenditure on agricultural research and development (GRD), literacy rate (LR) and lag TFP (TFP_{t-1}). GRD captures the effect of government spending on research and development on the technology shift in the agricultural sector. Literacy rate (LR) captures the ability of farmers in adopting new technologies.

The third and fourth equation explains the determinant of agricultural and non-

agricultural wages. Both have the same determinants. The functions are as follows:

(3) $W = f(GEDU, GH, W_{t-1})$

(4) $NW = f(GEDU, GH, W_{t-1})$

The determinants of both wages are stock government expenditure on education (GEDU) and health (GH). Both variables capture the contribution of education sector and health sector to the ability of workers which leads to an increase in wages.

The marginal impact of public expenditures on poverty can be derived from these four equations. The marginal impact of stock government expenditure on agricultural research and development (GRD) is as follows:

$$\frac{dP}{dGRD} = \frac{\partial TFP}{\partial GRD}\frac{\partial P}{\partial TFP}$$

The marginal impact of stock government expenditure on education and health is as follows:

$$\frac{dP}{dGEDU} = \frac{\partial W}{\partial GEDU}\frac{\partial P}{\partial W} + \frac{\partial NW}{\partial GEDU}\frac{\partial P}{\partial NW}$$

$$\frac{dP}{dGH} = \frac{\partial W}{\partial GH}\frac{\partial P}{\partial W} + \frac{\partial NW}{\partial GH}\frac{\partial P}{\partial NW}$$

In order to convert flow data to stock data, the following procedure is used (Fan, Jitsuchon and Methakunnavut, 2004):

$$K_t = I_t + (1-\delta)K_{t-1}$$

Where K_t is the capital stock in year t, I_t is gross capital formation in year t, and δ is the depreciation rate (10%). To obtain initial values of capital stock, the following procedure is used:

$$K_0 = \frac{I_o}{(\delta + r)}$$

The above equation indicates that the initial capital stock in year 0 (K_o) is capital investment in year 0 (I_o) divided by the sum of

depreciation rate and real interest rate (r) which is assumed to be 3 percent.

DATA SOURCES

In calculating the equation several data sources are utilized. The poverty data is collected from Statistics Indonesia in Maksum (2004). The TFP data is calculated by Fuglie (2002). The wages data is collected from the Statistics Indonesia. Government education and health expenditure data are collected from the Asian Development Bank (ADB) Key Indicators. Government agricultural and research development expenditure is collected from Fuglie and Piggott (2002). Lastly the literacy data and consumer price index (CPI), which is used to convert data into real term, are collected from the World Development Indicators (WDI).

ESTIMATION RESULT

The model consists of four equations. The model is solved using Seemingly Unrelated Regression (SUR). The SUR method estimates the parameter in the system considering for the heteroskedasticity and contemporary correlation in the errors across equations (Eview 5 User's Guide, p681). The result of the system equation is summarized in Table 2.

Table 2. Impact of Public Expenditures on Rural Poverty.

$POV = 35.53 - 18.26\ TFP - 0.09\ NW + 0.18\ W + 0.64\ POV_{t-1}$ $R^2 = 0.88$ $(17.28)^{**}$ $(10.22)^{*}$ $(0.03)^{***}$ $(0.05)^{***}$ $(0.11)^{***}$
$TFP = -0.99 - 6.13E\text{-}08\ GRD + 0.04\ LR - 0.01\ TFP_{t-1}$ $R^2 = 0.94$ $(0.34)^{**}$ $(1.79E\text{-}08)^{***}$ $(0.01)^{***}$ (0.18)
$W = 8.71 + 0.001\ GEDU - 0.002\ GH + 0.82\ W_{t-1}$ $R^2 = 0.95$ (8.42) $(0.001)^{*}$ (0.001) $(0.10)^{***}$
$NW = 15.74 + 0.004\ GEDU - 006\ GH + 0.69\ NW_{t-1}$ $R^2 = 0.89$ (20.89) $(0.002)^{**}$ (0.004) $(0.13)^{***}$

Note: [***] statistically significant at 1 percent level
        [**] statistically significant at 5 percent level
        [*] statistically significant at 10 percent level

The first equation shows that all four variables are significant. Only agricultural wage sign is not expected; meanwhile other variables have expected sign. An increase in agricultural wage will increase rural poverty can be explained by the characteristic of agricultural employment. In the agricultural sector in Indonesia, farmers usually hire workers to do several on farm activities such as planting and harvesting. An increase in wage of these workers; will decrease the farmer's revenue which can cause increase in poverty especially for farmers who owns small amount of land or farmers who rent their land.

The coefficient of TFP is higher than non-agricultural wages; therefore it is more effective to reduce rural poverty through increasing TFP rather than increasing non-agricultural wages. From the first equation also implies that increasing non-agricultural wages can reduce poverty rather than agricultural wages.

The second equation shows the determinant of TFP. A shocking result shows that stock government agricultural research and development expenditure (GRD) has a negative impact on TFP also the coefficient is very small. This shows that the research and development expenditure is not effectively

used especially in increasing the TFP growth. The marginal impact shows that an increase in 1 million Rp of stock government agricultural research and development expenditure will increase rural poverty by 0.000001 percent or relatively small number or in other words the increase in government expenditure in agricultural research and development is indifferent to the rural poverty.

The second variable affecting TFP is literacy rate (LR). The result shows that increase in literacy rate will increase TFP which leads in declining rural poverty. An increase in 1 percent in literacy rate is expected to decrease rural poverty by 0.73 percent.

The third and fourth equation explains the determinants of wages. From both equations show that only stock government expenditure on education is significant and the sign is as expected. An increase in 1 million of stock government expenditure on education is expected to increase rural poverty by 0.0002 percent. The increase is caused by the increase of agricultural wage which is higher than the non-agricultural wage when government expenditure on education increases. In addition, an increare in government expenditure on education will also affect the literacy rate, which will increase TFP and ending in decreasing rural poverty.

CONCLUSION

In order to abolish the rural poverty, the government of Indonesia must focus on improving non-related agricultural sector such as education or literacy rate. From the model, it shows that in order to decrease rural poverty the government must focus its effort in increasing TFP through improving literacy rate. Increasing government expenditure on agricultural research will have no effect on rural poverty; meanwhile increasing government expenditure on education will have more effect in increasing agricultural wage rather than non-agricultural wage.

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