CHARACTERISTICS OF DEMOGRAPHY, ECONOMIC FACTORS, AND POVERTY IN GUNUNGKIDUL REGENCY

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Abstract

This paper aims to analyze the determinants of poverty in Gunungkidul Regency in 2006. It analyses SUSENAS data using the logit model with the estimation method of Maximum Likelihood Estimator (MLE). The variables included in the model are the characteristics of demography, economic factors, residential region and business loan. The result shows that poverty in Gunungkidul Regency is associated with residential region, household size, level of employment in agricultural sector, level of education, and the age of household's head. It also shows that household size is the main source of poverty. In addition, business loan is of important determinant factors in poverty reduction.

Keywords: demography, poverty, household size, business loan
JEL classification numbers: I32, N35

INTRODUCTION

Poverty is one of the most important issues in economic development which needs to be taken care of. Government's commitment to eradicate poverty is listed in the Medium Term Development Plan (RPJM) 2005-2009, which is organized by the National Strategy for Poverty Reduction (SNPK). In addition, signing the agreement of Millennium Development Goals for 2015 through RPJM, the government has developed the basic objectives of poverty reduction for 2009, namely reducing poverty from 18.2 percent in 2002 to 8.2 percent in 2009.

Based on the decision made by the state Minister for Development of Disadvantaged Regions number 001/KEP/M-PDT/II/2005 about National Strategy for Development of Disadvantaged Regions, Gunungkidul Regency (Gunungkidul, hereafter) was defined as one of the disadvantaged regencies in the Special Province of Yogyakarta. The disadvantages include human resources, facilities, infrastructures and low income level. These have led to the high level of poverty in this region.

Changing in macroeconomic indicators such as significant fuel price rise is suspected as the cause of significant increase in the number of poor people in Gunungkidul. The number of poor people was 194.4 thousand in 2005/2006. This has made Gunungkidul the poorest regency among the other regencies and cities in Yogyakarta.
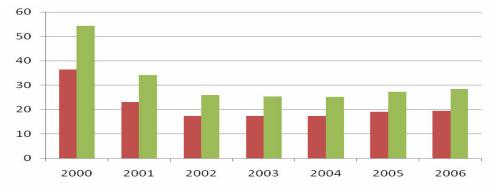
Table 1: Total of Poverty in Regency/City in Yogyakarta Special Province, 1999-2006 (%)

Regency	1999	2000	2001	2002	2003	2004	2005	2006
Kulonprogo	35.17	39.36	44.84	20.14	24.35	25.11	26.8	28.39
Bantul	30.04	35.16	23.09	25.12	20.00	18.55	18.21	20.25
Gunungkidul	35.98	54.27	34.21	25.86	25.34	25.19	27.29	28.45
Sleman	18.49	22.17	17.55	25.86	16.93	15.53	14.06	12.70
Yogyakarta	12.76	14.45	8.11	16.7	12.63	12.17	10.5	10.22

Source: Central Bureau of Statistics, Data and Information of Poverty, 2000-2006

To reduce the poverty level in Gunungkidul, the government needs to impose some policies. The development of agriculture sector is an important component in the policy because in the group of poor families, the main income source is agriculture and fishery sectors. Meanwhile, Wijono (2005) states that poverty alleviation efforts can be conducted by providing broad access to sources of funding for small and micro enterprises (SME) in poor communities which have the ability to increase their productivity.

Note: Both figures in each year are poverty in 10,000 and percentage, respectively.
Source: Central Bureau of Statistics, Data and Information of Poverty, 2000-2006

Figure 1: of Graphic Development Poverty in Gunungkidul Regency 2000-2006

Table 2: Occupation of Household's Head based on Category of Poor and Non-poor Household

	Non-Poor				Poor			
	South	Central	North	Group Total	South	Central	Total	Group Total
Non Agriculture	34.21	55.47	44.55	45.19	32.39	50.00	28.57	**35.78**
Agriculture	65.79	44.53	55.45	54.81	67.61	50.00	71.43	**64.22**
Group Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Central Bureau of Statistics in Gunungkidul Regency (various years).

The figure of the poor community during the last five years can be seen in Figure 1, which shows that the poverty rate has decreased by 25.19% in 2004, and increased sharply to 28.45% in 2006. The number of poor people has also increased in the year 2006 amounted to 191.4 thousand people.

The important characteristics of poor households to be examined are the type of business of the household's head. In 2006, the heads of poor households who work in agricultural sector is 64.22 percent, while 35.78 percent of them work in non-agricultural sectors, as listed in Table 2.

The problem of poverty alleviation is not merely related to macro-economic aspects, but to the micro-economic ones as well. Micro-economic variables are related to the probability of the household being poor. According to Sutopo (2005), in addition to macroeconomic variables, micro-economic variables also have links to poverty, such as access to the available capital. The existence of specialized financial institutions that serve the poor as Microfinance Institutions (MFIs) provide significant contribution in eradicating poverty. Poverty alleviation efforts can be done by cutting the chain of poverty, such as the provision of broad access to sources of funding for small and micro enterprises (SME). The loans provided by financial institutions on SMEs boost the economy through its multiplier effect by increasing production, providing employment, and ultimately increasing the income of the poor (see Wijono, 2005). Hariman (2006) finds that providing the funds to SMEs negatively affects the level of poverty, while the development in non-agricultural GDP significantly reduces the poverty level in West Nusa Tenggara.

Poverty research in micro aspects is conducted by Kabananukye et al. (2004) in Uganda using national household data surveys in 1999/2000. The results of the analysis show that age and gender affect poverty.

The study shows that female household's heads have higher probability to be poor than those of males. It also suggests that older household's heads have higher probability of being poor. Furthermore, labour in agricultural sector has higher tendencies to be poor. The results also show that residential areas affect the level of poverty. It also shows primary school education of adult male has a positive relationship with poverty status.

Geda et al. (2005) conducts research on the determinants of poverty in Kenya using welfare monitoring survey data. The dependent variable is the category of poor and non-poor households, which are based on their expenditure. The independent variables consist of property ownership of land and livestock, household characteristics of labor status (agricultural or non-agriculture), setor employment (formal or non formal), age, gender, education level, household size, the time required to fetch water and energy, and residency (rural/urban). The dependent variables for polychotomous model (ordered logit) consist of non-poor, poor and very poor households. The results shows that poverty is influenced by the level of education, household size and activity in the agricultural sector.

World Bank (2002) categorizes poverty based on the characteristics of poor communities, regions, households and individuals. Poverty is generally high at the area with the following characteristics: geographically remote, lack of natural resources, low level of rainfall, and bad climatic conditions. The characteristics of household and individual are represented by the following variables: (1) demographic variables include age, gender and household size, (2) economic characteristics of household employment include home ownership, income, and household consumption expenditure, and (3) social characteristics include education, health and housing households.

To measure household poverty, this paper uses household's per capita consumption expenditure. Household poverty status is measured by comparing their per capita consumption expenditure with the poverty line. The poverty line is that of the Central Bureau of Statistics version, which is based on the basic needs approach, consists of the food poverty line (food line) and non-food poverty line (non-food line). It is defined as the monthly per capita dollar spent to meet the minimum needs of food and non food. According to Indonesian Central Bureau of Statistics (2007), Gunungkidul poverty line is Rp132,134 per capita per month in 2005, while the poverty line Gunungkidul in 2006 was Rp177,292 per capita per month.

The research objective of this paper is to analyse the influence of characteristic of demography, economic variable, and business loan on the level of poverty in Gunungkidul in 2006.

METHODS

This paper applies the logit model, which is a combination of model by Geda, et al. (2005) and Bruck, et al. (2007). The dependent variable is a dummy variable which consists of poor and non-poor household. The paper uses Cumulative Logistic Distribution Function of logit models (L_i) for empirical estimation purpose, as follows:

$$L_i = \ln\left(\frac{p_i}{1-p_i}\right) = \beta_0^* + \beta_j^* X_i + \varepsilon_i \qquad (1)$$

The independent variables (X_i) are
UR   : Household size (people).
UMUR: Age of household's head (years).
PKR   : Occupation of household's head, 1 for agricultural, 0 otherwise.
LSK   : Education of household's head (years).
KU   : Acceptance of business loan, 1 if the household receives a business loan, 0 otherwise.

WT1   : Area residential households, 1 if residence is in the southern region, 0 if a residence is in other places.
WT2   : Area of residential households, 1 if residence is in the north, 0 if a residence is in other parts.

The model to test the determinants of poverty can be written as follows:

$$\ln(\frac{P_i}{1-P_i}) = \beta_0 + \beta_1 UR_i + \beta_2 UMUR_i$$
$$+ \beta_3 PKR_i + \beta_4 LSK_i \qquad (2)$$
$$+ \beta_5 KU_i + \beta_6 WT1_i$$
$$+ \beta_7 WT2_i + \varepsilon_i.$$

To check the validity of the model, this paper conducts several tests. First, it checks the significance of individual variable using normal (z) test. Second, it tests the overall significance of the model using the the chi-square test. Third, it tests the goodness of the regression line, which is carried out by finding the value of conventional coefficient of determination, with McFadden R^2 value, obtained by: $M_c FaddenR^2 = 1 - \dfrac{ULLF}{RLLF}$. This statistic measures the predictions of percentage of absorption of total observations. Another method that can be used is that of Andrews and Hosmer-Lemeshow goodness-of-fit tests, which is carried out by dividing the data into 10 equal classes, and then compares the actual Y value with the value in each class. Due to Geda et al. (2005), the value of statistical significance and Andrews HL statistic is greater than 0.05 or HL score statistics, and Andrews is not significant by statistical test, showing no significant difference between the predicted classifications with the classification of the observed. In regressing the binary model, goodness of fit test is the second priority, while the primary focus is on the sign and significance of regression coefficients.

The interpretation of the logit model will be distinguished by the type of variables, namely categorical and numerical variables. For independent variables with two categories, the interpretation of parameters is conducted by comparing the odd values from a value to the variable with odd values of the other values.

$$OR_i = \frac{P(1)/1 - P(1)}{P(0)/1 - P(0)} = e^{\beta_i} \, . \qquad (3)$$

This means that the probability of households being poor ($y = 1$) in the category $x_i = 1$ is exp (β_i) times the probability of being poor households ($y = 1$) in the category $x_i = 0$. If the independent variables used are continuous variables, the coefficient on the interpretation of regression models is that one unit increase in C units will have a probability of being poor households ($y = 1$) greater by the multiplier of $\exp(C, \beta_i)$.

The next step is finding the summary of the marginal effect value to determine the effect of changes in independent variables on the probability of being poor households,

which can be calculated using the following formula:

$$\frac{\partial P_i}{\partial Xij} = \beta_j P_i (1 - P_i) \, . \qquad (4)$$

The marginal effect is found by calculating the probability of households in the poor category in each independent variable by entering the sample mean value of each variable.

The data used in this paper are Susenas Gunungkidul in 2006 (see Central Bureau of Statistics, 2006), data from the year RPJM Gunungkidul 2005-1010; and supporting data such as GDP data, data on poverty, the people's welfare indicator data (inkesra), economic indicators and the human development index (HDI), which are taken from the Central Bureau of Statistics and Gunungkidul Government.

The model, along with the variables used in this paper, are the combination of researches of Bruck et al. (2007) and Geda et al. (2005). The dependent and independent variables definition are listed in Table 3:

Tabel 3: Variable Definition

Variable	Variables Definition
Poverty Status	Poverty status is the absolute poverty. A household is categorized to be poor if the income earned can not meet the minimum requirements, which is Rp177,292 per capita per month in 2006.
Household Size	People who live in a household for 6 months or more, or who will stay at home for 6 months or more are considered as a member of the household.
Age of the household's head	The age of the household man/women responsible for the daily needs of the household
Work of the household's head	Distinguished into agricultural and non-agricultural sectors.
The School Period of Heads of Household	The school period of heads of household is the cumulative number of years taken by the heads of household in participating in formal education which is calculated to the highest level of education or class highest level ever occupied.
Business loan Acceptance	Credit assistance from the domestic government programs, cooperations, individuals or banks.
Residence	Residence is the household residential areas, including the northern, central or southern areas. Zoning is based on topography, rock type, soil type, altitude areas, and state hydrology / water resources in Gunungkidul Regency.

RESULTS DISCUSSION

This paper conducts statistical analysis consists of partial and simultaneous tests for the feasibility of the model. Variables that will be included in the model are demographic characteristics and economic variables. Variables from demographic characteristics are household size, age of household's head, education of household's heads, characteristics that divide the region into north, central and south. The economic variables are head of household's jobs and business credit from the government. The estimated model, which is run by Eviews 4.1 software package, is as follows:

$$\ln(P_i/1-P_i) = -1.006 + \mathbf{0.690}\ UR_i$$
$$(-1.822) \quad (\mathbf{9.846})$$
$$- \mathbf{0.019}\ UMUR_i + \mathbf{0.362}\ PKR_i$$
$$(\mathbf{-2.674}) \quad (\mathbf{1.9398})$$
$$- \mathbf{0.138}\ LSK_i - \mathbf{1.427}\ KU_i$$
$$(\mathbf{-5.045}) \quad (\mathbf{-4.166})$$
$$+ \mathbf{0.356}WT1_i + 0.106WT2_i$$
$$(\mathbf{1.763}) \quad (0.487)$$

LR statistic (7 df) =181.5035
R^2McF=0,186045
McFadden R-squared =0.186045
count-R squared=70,88
H-L Statistic=6.940 (P-value 0.5431) Andrews Statistic = 7.6884 (P value= 0,6592
Description; In parentheses are Z values for the variables related

Individual significance test is conducted using the Z test. Z critical for the significance level of 0.10 is 1.28. It can be concluded that the number of household members (UR), age of household's head (AGE), the old school heads of households (LSK),

head of the household work (PKR), residential areas (WT1) and business loan (KU) affect the status of poverty by 10% level of significance. Note that the residential area (WT2) does not significantly influence poverty status.

The overall test for the model is done by likelihood ratio test (LR). Given the value of LR statistic of 181.503, and the critical value of 5% significant level of 32.67, we can reject the null hypothesis.

Goodness of fit test for the logit model consists of three categories, namely; McFadden R^2 (R^2McF), Count R^2 and Andrews and Hosmer-Lemeshow goodness-of-Fit Tests. The R^2McF is 0.186045, which means that approximately 18.6 percent of the variation of poverty status in 2006 can be explained by the variables in the model. R^2McF value has been good for data cross-section (Kabananukye, et al., 2004:35). The value of Count-R^2 is 70.88 percent, which means that there are 499 out of 704 observations from the corresponding predictions. The value of Andrews and Hosmer-Lemeshow goodness-of-fit test has a probability value that is greater than 0.05, indicates that there is no significant difference between the predicted classification with the classification of the observed. Thus, the logistic regression model is of good fit.

The economic analysis, based on the statistical analysis, focuses on the evaluation of the expected signs suggested by theory or previous empirical research. Economic analysis based on the regression coefficient logit model is performed by calculating the Odds Ratio and Marginal Effect according to the Table 4.

Table 4: Odds Ratio Value and the Marginal Effect

Variable	Coefficient	Odds Ratio			Marginal Effect
		Value	%	% influence	
UR	0,690	1,994	199,399	99,399	0,172
UMUR	- 0,019	0,981	98,072	-1,928	-0,005
PKR	0,362	1,436	143,644	43,644	0,091
LSK	-0,138	0,871	87,072	-12,928	-0,035
KU	-1,427	0,240	23,998	-76,002	-0,357
WT1	0,356	1,428	142,766	42,766	0,089
WT2	0,107	1,112	111,245	11,245	0,027

Table 4 indicates that the number of household members (UR), head of the household's job (PKR) and the residential area (WT1 and WT2) positively affect the poverty. This means that an increasing number of household members will increase the risks of home to be poor; the job of the household's head in the agricultural sector has greater risk of become poor compare to those of non-agricultural sector; and households living in the southern region have a greater risk of being poor than those of other areas.

The age of household's head (AGE), old group of household's head (LSK) and business loan (KU) negatively affect the status of poverty. It can be concluded that the increasing age of household's head tend to reduce the risk of become a poor household. Furthermore, the longer the head of formal education, the lower the risk of being a poor households is. Business loan utilization by the head of the household will also have an impact on decreasing the risk of being a poor household.

Table 4 also shows that the odds ratio for the increasing number of household members have a poor risk is the greatest, namely 99.39. This means that if the member of a household increased by 1, the probability of the household become poor increased to 99.40 percent. Business field of household's heads work has the odds ratio

of 43.64, which means that the household's head who work in the agricultural sector has a poor risk of 43.64 per cent larger than the household's head who work in non-agricultural sector. Households that live in the south has odds ratio of 42.766, which means that the family who lived in the south region has the change of 42.76 per cent bigger than those in the northern are to be poor. The use of business loans has the greatest impact on poverty reduction compared to the status of the education variable of household's head and age of household's head

The analysis can also be conducted using marginal effects approach, which gives similar results. If the member in a household increases by 1, the risk of a household being poor would increase by 17.2 percent. The marginal effect of variable business loan is -0.357, which suggests that the chances of households in the poor category will decrease by 35.7 percent if the household get business loan. Households that live in the southern region has a marginal effect of 0.089, which means that the chances of households in the southern area to be poor will grow by 8.9 compare to those of the northern area.

CONCLUSSIONS

The results of the analysis showed that providing credit for business purposes to the poor family had the greatest role in reducing

poverty. SUSENAS data from the year 2006 revealed that business loans were channelled from government to the community as the Sub-Regency Development Program (KDP), P2KP programs, other government programs, banks, cooperatives/foundations, individuals and other programs. The largest percentage poor households received a business loan from the bank programs by 60 percent. The second largest percentage of a cooperative is recorded at 26.7 percent. Business loan was used to open businesses and raise capital so that the public production has created jobs and ultimately increased the income of the poor.

The characteristics of region also had an influence on the risk of become poor. SUSENAS data for 2006 showed that 45.37 percent of poor households live in the south, followed by 29.07 percent in the northern region, while the remainder lived in the central region.

Based on the results of this study, some conclusions could be drawn. First, variables that might increase the risk of become poor was the number of household members, types of employment of household's heads, and residential areas. Variables that had the greatest effect in increasing the risk of become poor is the number of household members. Second, variables that could reduce the risk of become poor are education of household's head, age of household's head and business loan utilization. The third biggest variable in reducing the risk of a poor household was the use of business loans.

Some policy implications that could be recommended to alleviate the poverty were as follows. Efforts to reduce poverty was to pay more attention to zone residential areas, especially the south, followed by the northern region. To reduce the poverty by reducing the number of household members, the government needed to improve the control of family planning to reduce the population growth. To reduce the poverty in agricultural sector, the government may adopt agricultural technology training programs to enhance human resources and skills, and expand the access to capital and insurance services marketing. Efforts to improve the education of household's heads and household members in the long run can be done by improving the education sector budget for school improvement, school infrastructure and educational opportunities to a wider base for the school age population. To increase the use of business loans, the government might provide economic empowerment opportunities through access to credit and business capital for poor households, especially to the south.

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