DETERMINANT OF CIGARETTES CONSUMPTION ON POOR HOUSEHOLDS IN REGENCY OF SITUBONDO, INDONESIA

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ABSTRACT

Poverty was a pervasive problem in a sustainable manner not only in economic aspects but also in noneconomic aspects. In line with this phenomena, generally spending patterns of poor households was dominated by food and the rest is others need, like tobacco. The tobacco was a fancy commodity which being priority consumed by the poor household. This condition was huge worried due to it would neglect the expenditures for food and other primary needs. This study aims to analyze income and prices of goods complementary to cigarette consumption in poor households in the Situbondo regency. The data used is the cross section data collected through standard questionnaire. The observations and interviews were conducted to 380 poor households as samples are divided into proportionally, based on the number of poor households in 12 villages in Situbondo regency. The data will be analyzed using descriptive analysis of narrative and causal analysis using a Two Part Demand Model was developed by Cragg (1971). The first step model was using Probit analysis that was aimed to determine the probability of the households to smoke. Meanwhile the two-step model using Ordinary Least Square (OLS) method was applied especially for cigarette consumption households. The results of this study indicated income and price of complementary goods (such as sugar and coffee) were significantly influence to cigarette consumption. On the other hand price was not a significantly effect on the decision to smoke, but it had significantly effect to the quantity of cigarettes smoked. Higher cigarette expenditures will reduce spending on health and education.

Keywords: Cigarette consumption, poor household, income, prices of goods complementary, Two Part Demand Model

INTRODUCTION

Poverty emerges to be globaly problematic that grows sustainably, lies in the economic aspects of the desire for the fulfillment of human uncontrolled needs even with limited resources. The biggest expenditure patterns of poor households are the needs of foods, followed by the expenditure on consumption of tobacco (including cigarettes) and betel. Knowing the amount of the expenditure on tobacco consumptions of the poor is worrying since it would minimize the expenditure for foods and other

essential needs. Based on Engel Law in Putong (2010) which revealed that household expenditure is influenced by the level of income. At this point it can be described that the higher a person's income, the lower the percentage of disposable income to buy food or other primary needs (inferior goods) will be decreased. So that when the levels of income are relatively low, the expenditure for food will be more prioritized than one for non-food.

Cigarette consumption patterns are influenced by the price of cigarettes, the price of other goods and income per capita (Ross and Chaloupka, 2002). The same thing also stated by Adioetomo, et al (2005) that the price does not affect household's decisions to consume tobacco, but the price affects the amount of tobacco consumed. The higher the price of cigarettes, the fewer the tobacco consumption on poor households will be, and once the income rises, the cigarette consumption increases (Surjono and Hand, 2013). While on household demographic factors that affect cigarette consumption were age, education and religion as stated by Wilkins et al (2000), also gender and education (Harahap, 2003).

The purpose of this paper is 1) to describe the characteristics of poor households and household expenditure patterns related to the consumption of cigarettes in the district of Panji, Situbondo Regency, 2) analyze the influence of income, complementary goods expenditure on cigarette consumption of poor households in Panji, Situbondo Regency. Primary data collection conducted through interviews with the head of household (respondent) using questionnaires with lists of questions that had been prepared and will be analyzed using narrative descriptive analysis, descriptive statistics and causal analysis using the two-part demand model.

LITERATURE REVIEW

Research on cigarette consumption level have been carried out many times and one of them carried on the poor households. Wang et al (2005) suggested that the increase in the percentage of tobacco consumption level is gone along the increase of alcohol consumption. In China, the higher the expenditure on tobacco consumption, the higher the household's income will be compared to the income of households with no expenditure on tobacco. This is in contrast to the results presented by the Farrelly and Bray, 1998, in Wang et al, 2005 that smoking is identical with groups of peole with low

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education and low income. As expressed by Adioetomo et al (2005), cigarette consumption in low-income groups is 3.9 pack / capita / month, in the middle income group is 6.2 pack / capita / month and in the high-income group is 7.8 pack / capita / month. But based on the percentage of total households income, low-income groups have high consumption rate i.e. 7.24 per cent of total income, middle income group has 5.5 percent and 3.0 percent for high-income groups.

Adioetomo (2005) explains that the price of cigarettes does not affect the decision to smoke or not, but it affects the number of cigarettes consumed. The Increase of income also affects the level of cigarette consumption, where the increase of 10 percent of income increases the number of cigarettes consumed up to 7.6 percent. Efroymson, et al (2001), Jha and Chaloupka (2000) and Triana (2011) found the socio-demographic variables that influence the level of cigarette consumption i.e. including monthly household income, the number of adult household members ($\geq$ 18 years), non-cigarette consumption, the region type of residence and the head of household's education. However, according to Jha and Chaloupka (2000) the age of the head of household is a variable that does not affect cigarette consumption.

RESEARCH METHOD

This paper uses primary data in the form of cross section data. The data is obtained through interviews with heads of households (respondents) using questionnaires. This research is carried out in Panji, one of districts in Situbondo Regency, with 380 households taken as samples. The selection of samples of the respondents is determined by Proportional Stratified Random Sampling. The model used in this paper is adopted from a model used in a previous study by Cragg (1971), which is later transformed into two models.

First, the probit model is a regression analysis technique which is used to estimate the possibility of an event with the the binary scale independent variables. This method uses the Cumulative Distribution Function, which is used to predict opportunities tendencies of an independent variable (Vasisht, 2000). Hann (2008) states that the greater the number of samples, the higher the accuracy of probit models will increase. Here is a general formulation of Probit models:

$$\Pr(y = 1) = \Phi(\beta'x) \int_{-\infty}^{\beta'x} \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}z^2\right) dz \qquad \text{......................(1)}$$

$$\Pr(y = 0) = 1 - \Phi(\beta'x) \qquad \text{......................................(2)}$$

$$E(y|x) = 0 \times (1 - \Phi(\beta'x)) + 1 \times \Phi(\beta'x) = \Phi(\beta'x) \text{..........................(3)}$$

where:

x = Independent Variables

β = k x 1 Coefficient vector

Φ = standard of cumulative distribution function

Furthermore Probit model formulation is used to perform the estimation of the samples both who smoke and who do not smoke, as follows:

$$P_i = \frac{1}{1 + e^{-(\beta 1 + \beta 2 X 1)}} \qquad \text{..(4)}$$

In this case, we do not observe the value of Pi but rather the consumption of cigarettes, that is if the respondent is smoking (C = 1) and when do not smoke (C = 0) then it will be as

$$\Pr(C = 1) = P_i \text{...(5)}$$

$$\Pr(C = 0) = (1 - P_i) \qquad \text{..(6)}$$

Some test used is a G test to examine whether there is a significant influence between independent variables on the dependent variable simultaneously or not, Wald test is to determine the effect of each independent variable on dependent variable partially.

The second model will do the calculation of estimates empirical research which is specified as follows:

$$C = \beta_0 + \beta_1 YDI + \beta_2 PC + \epsilon_i \text{...(7)}$$

where:

CC = Consumption of cigarettes for a month (Rupiah)

YDI = Household income (Rupiah)

PC = Expenditure complementary (coffee and sugar) (Rupiah)

e_i = error term

The process above will be analyzed using the methods of causal analysis used to answer the empiric questions by using the two methods of analysis i.e. First Step Model

(Probit) method and Ordinary Least Square (OLS) method. Model Probit is a regression analysis technique used to estimate the probability of an event with the binary scale independent variables. This method uses the Cumulative Distribution Function, which allows to predict tendencies opportunities of an independent variable (Vasisht, 2000). OLS aims to determine how much is the influence of independent variable on the dependent variable through estimation results in this test, it can be seen through the estimated value of the t test, F test and R^2 test (Gujarati, 2004; Wooldridge, 2013). Besides, in the OLS test there will also be performed classical assumption test to see the nature of BLUE (Best Linear Unbiased Estimator). There are five test to the deviation in the classical assumption that include heterogeneity test, autocorrelation test, multicollinearity test, normality test and linearity test.

DISCUSSION

The depiction of poverty and poor household expenditure patterns that occurred in the District of Panji based on primary data obtained through interviews of 380 respondents of poor households show various result. Most of the respondents did not complete the primary school education which the number reaches 73.95%. The respondents with non-agriculture livelihood are as much as 35.26%. Respondents who smoke are 65.26%, and the dominant is 21-60 years old. The income of poor households in the District of Panji dominated by income ranges between 751,000 Rupiahs to 1,500,000 Rupiahs,- as much as 49.21%. The soil roofed-tile houses of the respondents are (72%) as the roof of his house, using wood (37.63%) as the walls of the house, using cement floor (56.57%), and houses not completed with toilets as much as 50.26%.

Expenditure patterns of poor households in the district that allocates the income for tobacco consumption is 14.50% to 32.36% of the total income earned by poor households in the district. Expenditure on staples food is about 23.26% to 33.66% and for side dishes is 19.78% to 40.61. A smaller percentage shown in the portion of expenditure on fuel and telecommunications i.e. 6:37% to 19:18% and 0.82% to 6.07%. Of the total respondents who smoked (248 respondents), 84.68% of them habituate themselves to smoke while consuming coffee, per day cigarette consumption is between 4 to 10 cigarettes with an average price per pack ranges between Rp 5.380,95 to 7.682,69. The affordable price is chosen by 47.18% respondents to choose certain

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cigarette they consume. 92.74% of respondents chose to consume filtered-cigarette instead choose the cigarette they need to roll themselves, where 63.25% of respondents preferred the filtered white cigarettes.

Table 1. Probit Analysis Method Result

Model	C	β_1 (Income)	β_2 (complementary expenditures)	McFadden R-squared	Wald Test
General Model	- 11,4662 (-5,8051) [0,0000]*	0,8534 (5,5433) [0,0000]*	0,0055 (0,0707) [0,9436]	0,0789	0,0000
Model 1	- 13,4794 (-5,9324) [0,0000]*	0,8486 (5,1441) [0,0000]*	0,2012 (2,1107) [0,0348]*	0,1060	0,0000
Model 2	17,8241 (2,5118) [0,0120]*	-1,4485 (-2,3779) [0,0174]*	0,2666 (1,2781) [0,2012]	0,0760	0,0143

Explanation:
1. Figures with no parentheses is the regression parameter values in each variable
2. Figures in parentheses () is the value of z-statistics for each variable
3. Figures in square brackets [] is the probability value for each variable
4. *) is significant at $\alpha = 5\%$

Source: Primary data, processed

The results of Probit analysis showed that the percentage of coefficient value of income (YDI) elastically gives significant positive effect on cigarette consumption (CC) of 0,853, with a probability value of 0,00 (<0,05). While the coefficient value percentage of complementary expenditures (PC) elastically does not significantly gives positive affect on cigarette consumption (CC) of 0,005. Complementary expenditure variable (PC) can also be seen from the probability value of 0,943 (> 0,05). Based on the Wald test that has been done then obtained probability value of 0,00 (<0,05), so there is a partial effect between the dependent variable and independent variables. Meanwhile, the results of the regression analysis shows the percentage of the income's coefficient value (YDI) elastically gives significant positive effect on cigarette consumption (CC) of 0,742. It can also be seen from the probability value of 0,00 (<0,05). Similarly, the coefficient value percentage of complementary expenditures (PC) elastically give significant negative influence on cigarette consumption (CC) with a probability value of 0,0014 (0,05). And the value of R-squared is 0,178778 shows that the two variables are only able to explain the 17% dependent variable while the rest is

influenced by other variables. Based on the eviews 8 analysis there found that the higher the income, the higher the number of cigarettes consumption increases.

Table 2. OLS Analysis Method Result

Model	C	β_1 (LogYDI)	β_2 (LogPC)	F-test	Adjusted R-squared
General Model	3,3383 (2,6000) [0,0099]*	0,7420 (7,2833) [0,0000]*	- 0,1527 (-3,2291) [0,0014]*	26,5590 [0,0000]	0,1720
Model 1	0,3460 (0,2188) [0,8270]	0,8682 (7,6580) [0,0000]*	-0,0361 (-0,6084) [0,5436]	26,8686 [0,0000]	0,2311
Model 2	5,2618 (1,8069) [0,0767]	0,6711 (2,7113) [0,0091]*	-0,2326 (-2,7141) [0,0090]*	4,3306 [0,0183]	0,1116

Explanation:
1. Figures without parentheses is the regression parameter values in each variable
2. Figures in parentheses () is the value of t-statistic for each variable
3. Figures in square brackets [] is the probability value for each variable
4. *) is significant at α = 5%

Source: Primary data, processed.

OLS estimation results in Table 4.17 shows that the general model of income variable coefficient value is 0,7420, which means that if an increasing of one unit income happens, then elastically will be responded by the households to consume cigarette up to 0,7420. While complementary expenditure variable has -0,1527 coefficient value, which means that if there is an increasing of one unit complementary expenditure, then elastically will be responded by the households to reduce cigarette consumption up to 0,1527. F test result on the general model shows that the F statistic probability value is equal to 0,0000 (less than α 5%), which means simultaneously independent variables (complementary income and expenditure) affect the dependent variable (household to cigarette consumption). T test results on the general model shows that significantly income variable affect households to consume cigarette because it has less than α 5% t statistic probability value that is equal to 0,0000.

Whereas, complementary expenditure variable also also affect households to consume cigarette due to the t statistic probability value that is less than α 5% is equal to 0,0014. From the three models (the general model, model 1 and model 2) is obtained the same results that the income effects on the number of cigarettes consumed. While complementary expenditure (sugar and coffee) effects negatively and significantly on

cigarette consumption. Two of the three models (the general model and model 2) have the same results that the complementary expenditure gives negative effect on cigarette consumption. While significant influence between complementary expenditure and cigarette consumption is not found in the first models (model 1) result.

RECOMMENDATION

Based on the results of field observations and the conclusions outlined about cigarette consumption determination of poor households in the district of Panji there are several recommendations formulated by the writer. The results of this research needs further study on the analysis of cigarette consumption, especially with variables other than complementary income and expenditure variable such as the effect of advertisement, smoking instruction (*Fatwa*) and health costs, so that the study could obtain more comprehensive research. In addition, government efforts are needed on the importance of empowering people / poor communities to improve the effectiveness and sustainability of poverty reduction. In the effort of poverty reduction, it is very significant not to treat the poor solely as developmental objects.

These efforts need to be done so that the poor people can attempt to escape poverty and not fall back on poverty. In addition, improving poor people's access to basic services, such as access to education, health, water and sanitation, and food and nutrition is important. The increasing of the access could ease the costs that have to be incurred by the poor. On the other hand, improving access to basic services encourages the increasing of human capital investment.

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