Analysis of Factors Influence Smoking Behavior in Poor Households in West Sumatera Province

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Abstract

This research is purposed to learn the behaviors of poor households in managing their income for buying cigarettes using data from the National Social Economic Survey of West Sumatera Province in 2013 using OLS method as a tool of analysis.

Results of the analysis show that the cigarette spending in percentage of income in smoker households in West Sumatera Province is very large, far larger than the percentage of spending for education and health. Household cigarette spending is influenced by income factors, cigarette prices, number of adult male household members, area of residence, age category of the household head, and education of the household head.

JEL Classification: D10, D31, P46
Keywords: *Cigarette Spending, OLS Regression, Smoking Household, Taste Intervention*

1. INTRODUCTION

Data released by the World Health Organization (WHO) (www.who.ini, May 2014) shows that smokers in the whole world have reached 1 billion people, 80% of the mentioned smokers live in a low and middle income level. Spending for cigarettes especially in families with low incomes, causes a decrease in household spending for basic needs, neither for buying food nor for fulfilling education and health as an investment for escaping from poverty.

West Sumatera Province is included in where the percentage of the poor population is moderately high, which is 7.56% (Badan Pusat Statistik Provinsi Sumatera Barat, 2014). The spending of cigarettes also take a large amount of spending, as an illustration, the average tobacco household spending reaches 6.64% in the city, but it reaches 9.71% in rural areas (Badan Pusat Statistik Provinsi Sumatera Barat, 2014). From the number of cigarettes that are smoked each day the average smoker with an age of 10 years and above in West Sumatera Province are 15.8 cigarettes/day which is the fourth highest in Indonesia (Badan Penelitian dan Pengembangan Kesehatan RI, 2013). With the mentioned illustration, the spending of cigarettes will give a large consequence to the difficulty of the eradication of poverty and causes a large waste in every layer of society in West Sumatera Province.

If we compare with the spending for education as an important factor for increasing productivity and to decrease poverty numbers, the proportion for cigarette spending reaches 1.33 times for the cities compared to education spending. For the rural areas the proportion of cigarette spending is even larger, reaches 3.6 times spending for education. According to Elfindri et. all (2008) poor families in West Sumatera have an impact on the chance of children not schooling. In two periods of research in 1999 and 2003, the probabilities of children from poor families which are not in school increased in comparison to the children from wealthier families.

Based on the above explanation and lack of academic paper that discusses about the spending of cigarettes in poor households in West Sumatera Province, the objectives of this research are as follow:
1. Describing profiles of poor households that have spending for cigarettes in West Sumatera Province.
2. Analyzing factors that influence the spending of cigarettes in poor households in West Sumatera Province.

2. THEORETICAL FRAMEWORK AND PREVIOUS RESEARCH

In conventional economics, the studies discuss more about the behavior of consumers, determination of prices, markets, corporations in the production scale and welfare economics. For that, in health economics the study approach should move from the concept of macroeconomics to the concept of household economics (Elfindri, 2003).

In household economics, the individual will be satisfied by consuming certain goods and services but it is not necessary that the individual will make the decision to reach the mentioned satisfaction. Which means that in household economics the actions will be taken based on compromise between husband and wife in the household. goods that are consumed to satisfy household needs. The income used is also a combination between individual incomes in the household such as the incomes of the husband and wife (Elfindri, 2003).

The function of household in maximizing their utility according to Becker (1965) is written as the following:

$$U = U(y1, y2 \ldots \ldots \ldots ., yn) \qquad (1)$$

where U is the household utility and y are the goods consumed.

Some hypothesizes, about why poor people smoke more, are proposed by Bobak et. all (2000). They explain the social-economic gradient in smoking. The hypothesizes which are primarily connected to Western countries, could be valid in other countries are:
1) The hypothesis that says the poor and less educated people are less aware of the dangers of smoking to health and therefore they are highly possible to adopt the smoking behavior.
2) The hypothesis that says the smoking behavior become a form of self-healing used for managing mood, stress management, and for solving the obstacle of material lack (Graham 1987, 1994 in Bobak 2000). However, this self-healing

hypothesis is unable to be maintained because of the lack of tranquilizing medicine or the effect of anxiolytic nicotine.

3) The hypothesis that says the smoking behavior is to replace the person presentation, such as smoking is often illustrated as one thing that poor people can do for themselves (Graham 1994 in Bobak 2000).

4) Economic hypothesizes says that since the benefit of smoking are the same, someone with low income will have less loss from health problems in the future than people with higher income. At the end, there is a proof that shows the level of nicotine in poor smokers are larger, although this observation cannot explain on its own why poor people smoke more.

The research of Ahsan (2006) by using 2004 national social economic survey data summarizes the factors that significantly influence the consumption of cigarettes. Those are cigarette prices, income, the age of starting to smoke every day, work, location of residence age, education level, and the condition of residence. The research of Surjono et. all (2013) uses panel data of the national social economic survey found that in 2008, 46.3% of poor households spent for cigarette consumption. In 2009 it decreased slightly, but then in 2010 it became 47.2%. The proportion of spending for cigarettes is as large as 0.034-0.040. The price of cigarettes consumed by poor households are relatively cheap.

Surjono et all (2013) is also mentioned characteristics of the household head that is suspected of influencing cigarette consumption are age, length of schooling, work status. Other than that, it was known that the absolute coefficient of total spending to the proportion of cigarette spending in poor households is 0.038 in 2008. This shows that for poor households the more and more their income rises, the proportion of cigarette spending becomes larger. The cross price elasticity of cigarettes in poor households are negative. This means that an increase in cigarette prices will decrease the proportion of income for cigarettes, while the elasticity of income in the years 2008-2010 is 2.14. It means that an increase of income by 1% will increase the consumption of cigarettes in poor households by 2.14%.

Research done by Yuwono (2013) found that the more the number of poor household smoke, the household will fall deeper into poverty. The Adioetomo et. all (2005) implemented a research by using the variable household income, cigarette customs, regional variables, education (the proportion of education in the household), the occupation of the household head, region, proportion of males in the household and the composition of age in the household members using a logistic regression found that the prevalence of smoking in families with low incomes is higher. For every type of cigarette, the higher the income, the more expensive the cigarette consumed.

Another previous research that use the OLS regression model to analyze smoking behavior is done by Alachkar (2008). It uses cigarette spending and household tobacco (Household Expenditure On Cigarettes and Tobacco) in Syria as a dependent variable. For its independent variable, among others, uses the income variable and some control variables such as dummy variables village/city and polygamy or not variables.

3.   RESEARCH METHODOLOGY

This research was focused on poor households that reside in West Sumatera Province which spread in all regencies/cities. It is often founded that the poor households having financial difficulties to send their children to school, still buy cigarettes. The reverse condition that happens in West Sumatra "already poor and also smoke" and very high household spending on cigarettes per day are the reasons in choosing this region for research.

The data used in this research is the raw data of national social economics survey (Susenas data) in 2013 done by the Badan Pusat Statistics Indonesia (Central Statistical Agency of Indonesia). The data of poor households was chosen. The criteria of poor people were based on the food poverty line and non-food rural + city in the month of September 2013, which is Rp. 336.606 (BPS, 2014). The number of samples used in this research is about 435 household.

The model used in this research is adopted from Alachkar (2008), which is a regular OLS model. With some modifications in its independent variables, this research is testing the following model:

$$ERT = \beta1 + \beta2 + \beta3Pi + \beta4ARTLD\ i + \beta5DDTTi + \beta6EDUCi + DUKRTi + Ui \quad ....(2)$$

Where:

ERT   = Cigarette household spending in one month
I   = Income (proxy from household spending in one month
P   = Proxy cigarette price
DDTT = Location of the residence of poor households whether in areas with a low level of poverty or high in the form of a dummy variable. a "1" value is given for areas with a low level of poverty, a "0" value for others
EDUC = Level of education of the household head, (value, 1 = did not finish Primary School/Equivalent, 2 = finished Primary School/Equivalent, 3 = finished Junior High School/Equivalent, 4 = finished Senior High School/Equivalent or higher)
DUKRT= Age of household head (value "1" for household head age until 45 years old, and "0" for others).

4.   FINDING AND ANALYSIS

The average cigarette spending per month in poor households is about Rp. 200,593.44/household or 46,805.13/week/household. The type of cigarettes bought by poor household are as follow:

Table 1 Types of Cigarettes that are Bought by Poor Households in West Sumatera Province in 2013

Cigarette Type	Number of Households		Pack Cigarettes/ week
	Frequency	%	
Filter Kretek Cigarettes	299	68,7	6,56
Kretek Cigarettes Without Filter	105	24,1	7,14
White Cigarettes	38	8,7	6,45
Total	442	101,5	

Sources: Susenas data processed by writers

Note: The total of households is more than 435 or 101.5%
since there are 7 households buying 2 types of cigarette.

The spending for cigarettes is about 12.59% of total household spending. The biggest spending of cigarettes is in the rage of 5%-10% and 10%-15% of the total spending. From a cross tabulation between the percentage of cigarette spending and the number of adult male household members, we can see that most adult male household members are with 1 adult male person with the most cigarette spending in the range of 10%-15% reaching 24.1% of the total sample. The second largest is in the 5%-10% range reaching 17% from the sample. The average income of poor households in West Sumatera Province per month in 2013 is about Rp. 1,635,988/household, averagely with 5.5 household members and average per income of Rp. 286,098. The average price of cigarettes bought by poor households is Rp. 7,165 per pack. However, the observation shows that the cigarette price bought most by poor households in West Sumatera Province is at the price of Rp. 5,000 to Rp. 6,000 (23.9% of poor household). Rp.6000/pack cigarettes are the most, which are bought by 10% of poor household

From a cross tabulation between the average price of cigarettes and cigarette spending per month, we can see that the cigarette most often bought is at the price of Rp. 5,000 to Rp. 6,000 per (23.9% of the total samples). At this price level, the cigarette spending is at the range 10%-15% of the total spending. The average number of male household members in poor households is about 1.67 persons. Most household member in West Sumatera Province is only one person. The data also shows that the prevalence number of female smokers is only 2.21%. Therefore, the cigarette spending in a household that greater than 12% from the total spending, is mostly spent by one male.

Poor households with an average income of Rp. 336,606 and lower, that have spent for cigarettes, live more in areas with a high level of poverty. There are 385 households or 88.5% of sample that live in areas where the poverty is high. Meanwhile, there are only 50 households or 11.5% that live in areas with a low level of poverty. The following table is a comparison of cigarette spending in the two mentioned areas:

Table 2 Comparison of Cigarette Spending Percentage Based on Resident Areas Smoking Households in West Sumatera Province in 2013

Area of Residence	Cigarette Spending(%)
Regency/City with a high level of poverty	12,84
Regency/City with a low level of poverty	10,73
Total	12,59

Sources: Susenas Data Processed by Writers

From the table above, we can say that the average spending in poor households in regencies with a high level of poverty reaches 12.836%. It is higher than the regencies with a low level of poverty (10.73%.) The average spending for cigarettes in all areas is 12.59%. Such cigarette spending of poor households in West Sumatera Province is much higher than cigarette household spending in the city areas (6.64%) and in the rural areas (9.71%) in Indonesia (BPS, 2014). This number is the same as the finding in China where the cigarette spending in poor

households is 6.6% in the cities and 11.3% in rural areas (Hu,2005). This result is also the same as Nasrudin (2013) research found that the percentage of cigarette spending in Indonesia is higher in poor families.

The education level of household heads finished primary school is about 39.45%, while there are 32% with no certificate. A cross tabulation between the level of education of household head with the percentage amount of spending in smoking households, we can see that the cigarette spending of household head with a primary school certificate is in the range of the 5%-15% number. This is not different with the household head with no primary school certificate. The age of such household head is in the category of 45 years and under. The cigarette spending of household head with age of 45 years and under is 12.88%, which is 0.64% higher than household heads with an age of 46 years and above.

Table 3 Results of OLS Regression Processing

Model	B	t	Sig.
(Constant)	-44117.207	-2.213	.027
Household Income per Month	.067	6.673	.000
Average price	16.025	10.412	.000
Number of Adult Male Household Members	18658.794	3.351	.001
Area of Residence in Low/High Poverty Areas	-32872.340	-2.415	.016
Household Head Education Category	-8749.648	-2.076	.039
Age_Category	20529.071	2.148	.032
a. Cigarette Spending per Month Dependent Variable			

R=0,614
R²=0,377
Adjusted R²=0,368
F count = 43,177

Sources: Susenas data processed by writers

The OLS regression results as above table can be summarized as follows:

1. Income Variable

The income variable has a positive relationship with cigarette spending. If the income of poor household increases by 1 (one) unit, it will increase the spending for cigarettes by 0.067. In other words, the rise of income by Rp. 100,000 per month, the cigarette spending rises by Rp. 6,700. The elasticity is calculated at 0.5464, in other words, the increase of income by 10%, the cigarette spending also increases by 5.5%. It means that an increase in income of poor households, a portion of such income will be allocated to buy the cigarettes, either in the form of additional numbers of cigarettes or the change in type of cigarettes that more expensive. If the income decreases, household spending for cigarettes will also decreases, it can be the decrease in the number of cigarettes or buying cheaper cigarettes.

Such findings are similar to other research such as by Yuwono (2013) where the income elasticity of the number of cigarettes consumed is 2.14, Adioetomo's (2005) research with 0.65 income elasticity, and Ahsan's (2006) research with income elasticity of 0.6 for poor people and 0.21 for rich people.

2. Price Variable

The price has also a positive effect on household cigarette spending. From the regression results we can see that an increase of price by 1 (one) unit will increase cigarette spending as large as 16.025 units. In other words, an increase of cigarettes' price by Rp. 1,000/pack will cause poor household spending for cigarettes to increase by Rp. 16,025/month.

This finding is confirmed by the previous research which mentioned that the cigarette price is negatively inelastic with the number of cigarettes bought. Yet, in this research we are able to see the effect to household spending as a whole. An increase in cigarette price, whether because of tax policy on cigarettes or other factors such as the effect of a raise in fuel prices, will causes more spending on cigarettes for the poor smoking households. If there is no change in income, the effect is on the decrease of household spending for other needs.

With the elasticity of 0.57, it means that every time the price of cigarettes increases, the amount of money spent by smoking households for buying cigarettes will increase. An increase of 10% in cigarette prices will increase cigarette spending by 5.7% on average. This finding is different with the results of previous researches which summarizes that cigarette price is negatively inelastic. It means that if there is an increase in cigarette prices, the number of cigarette packs bought decreases. However, the decrease is not as large as the cigarette price increase so that the total spending on cigarettes still increases.

Meanwhile, this result is supporting by the research of Adioetomo et all (2005) that suggests the government be careful in increasing cigarette tax because it will make the income proportion of households spending on cigarettes is higher.

3. Number of Adult Male Household Members Variable

From the regression results we can see that the addition of 1 (one) adult male household member (age 15 or more) will increase the spending of poor households for cigarettes by Rp. 18,658.8/month.

4. Residence Area Variable

From this variable we can see that household cigarette spending live in regencies/cities with low poverty level (Dummy code "1") are lower than those live in regencies/cities with high poverty level. The regression result shows that the poor household monthly spending in regencies/cities with low level of poverty is Rp 32,872.3 smaller than the households in regencies/cities with high level of poverty.

5. Education of the Household Head Variable

The education of the household head has a negative impact on the spending of poor households for cigarettes. An increase in 1 level of education will decrease the household cigarette spending by Rp. 8,749.6/month. This Study shows that the prevalence of smoking is higher in lower education societies.

The following table shows the difference in spending for cigarettes of poor household in relation to their education level:

Table 4 Simulation of Differences in Spending for Cigarettes In Poor Households Based on the Household Head's Education

Household Head Education Code	Household Head's Level of Education	Cigarette Spending Difference One Education Level	Cigarette Spending Difference Accumulation with those that did not finish Primary School
1	Did not finish Primary School/Equivalent	-	-
2	Finished Primary School/ Equivalent	- Rp8,749,6	-Rp 8,749.6
3	Finished Junior High School/Equivalent	- Rp8,749.6	-Rp 17,499.3
4	Finished Senior High School/Equivalent or higher	- Rp8,749.6	-Rp 26,248.9

Sources: Susenas data processed by writers

6. Age of Household Head Variable

From regression results we can see that household head aged until 45 years (dummy variable "1") has a higher spending than those who are older by Rp. 20,529.1 per month. This shows that in early periods of the household, the spending of cigarettes is larger. It means that when the household head's age is above 45 years, the awareness for controlling household cigarette spending is higher. This is possible due to health problems or experiences.

5. CONCLUSION

From the above explanation and analysis, the conclusion is the following:

1. The average cigarette spending of poor households in West Sumatera Province in year 2013 per household per month is Rp. 205,593.4. Such spending reaches 12.59% of the total household spending.
2. The average income of poor smoking households in West Sumatera Province is Rp. 1,635,988.4 per household per month, or Rp. 296,098.4 per capita. If the income increases, spending for cigarettes also increases. The research found that the increase in cigarette spending is by changing in cigarette type that is more expensive or buying more expensive cigarettes in smaller number.
3. In 2013, the average price of cigarettes bought by poor households in West Sumatera was Rp.7,165.3 per pack. The elasticity of cigarette prices to the total spending for cigarettes is 0.57, which means an increase in cigarette prices will cause the rise of total spending of poor households for cigarettes.
4. Factors that influence cigarette consumption based on data processing from the 2013 National Social Economic Survey (Susenas) of West Sumatera Province are income, cigarette price, number of adult male household members, residence area, age category of the household head, and education of the household head.

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