

# Smoking Behavior of Middle-Class Household and Participation in Private Health Insurance

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## Abstract:

Health insurance is a system of financial protection against possible risks in uncertain conditions, obtain better facilities and health services when ill. Illness gave the consequences of the risk of losing income opportunities and increasing healthcare spending. Mostly, consumers of private health insurance were Middle-class (per capita expenditure US \$ 2 - US \$ 20 per day). The number of them was relatively large (52.8 percent), but low enrolment on private health insurance (8.2 percent). Using 156,980-row data of Indonesia socioeconomic survey Q<sub>1</sub>-2017 (Susenas), the study aim to determine the effect of smoking behavior of middle-class households on private health insurance. To achieve the research objectives, a logistic model was used using Stata software. This study found that education of head family, employee status, household size significantly influenced private health insurance enrolment, conversely smoking behavior negatively influenced the probability of private health insurance enrolment. The probability of smoking influenced private health insurance enrolment 0.74 times lower than not smoking. Supposedly, there was a presence of advantages selection in the case of smokers in Indonesia. Smokers knew catastrophic health spending of disease due to smoking. Expanding insurance coverage due to smoking behavior requires a higher cost of health insurance paid (premium risk). It caused smokers to prefer partial health insurance coverage rather than comprehensive coverages.

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## I. INTRODUCTION

Indonesia is the world's second-largest market for tobacco. The Global School-Based Student Health Survey, 2015 found that around 23.0 percent of boys aged 13-15 were tobacco users and the age group of 15+, around 62.9 percent (Health, 2018; WHO, 2019). Susenas Q<sub>1</sub>-2017 revealed around 24.8 percent of 61.3 million households in Indonesia were smokers. Smoker households were generally spread evenly in urban and rural areas.

The price of cigarettes was relatively cheap, but the proportion of cigarette expenditure was relatively large with wide variations. In the middle-class household of smokers, cigarette expenditure was around USD 39.08 per month with variations between USD 0.3 to 514.29 (USD 1 = IDR 13,300). Consuming cigarettes reduces the allocation of household income to buy food and other non-food consumption. In poor households, smoking reduced consumption of nutrient-rich foods, child malnutrition and under-five mortality rates (Semba et al., 2008).

In addition, to enhance household expenses, smoking could decrease the quality of life, escalate the risk of cancer, heart disease, and stroke (Falk et al. 1989). Smoking-related diseases will kill half of the long-term smokers and half of these deaths will occur prematurely in age between 35 to 64 years (Yürekli et al. 2004). A pregnant woman who was smoke risk losing weight and length of the baby at birth (Jacobson et al., 1994). Increasing out of pocket for health care service due to smoking would lead to catastrophic health spending, to avoid it consumers would like to expand insurance purchases (Dewar, 1998; Jofre-Bonet, 2000; Levin, 1995; Sapelli & Vial, 2003; Yrjänheikki & Savolainen, 2000).

Various factors at the household level influence insurance purchasing decisions. Hopkins and Kidd (1996), Liljas (1998), Yrjänheikki and Savolainen (2000), Buchmueller, Fiebig, Jonesec, and Savage (2008), Buchmueller et al. (2008) and Tavares (2014) found that health risk factors play an important role in insurance decisions. Other studies, Levin (1995) and Yrjänheikki and Savolainen (2000) indicated that individuals with higher risk would purchase more insurance. Sapelli and Vial (2003) confirmed that persons who voluntarily purchase health insurance had a higher health risk than the average, and consumed more health care services than the persons who were not insured. But some other researches indicated that risk factors did not have significant effects on the purchase decision. Jofre-Bonet (2000) indicated that smoking had a great side effect on health, but did not have a significant effect on the purchase of life insurance.

Van de Ven and Van Praag (1981): confirmed that besides current health and medical consumption, income, education, family size, and age have considerable influence. Harmon and Nolan (2001): indicated that individual characteristics, such as education, age, gender, marital status, family composition and income all influence the probability of purchasing private insurance. Then, Abraham, Vogt, and Gaynor (2002) used the 1996 Medical

Expenditure Panel Survey on employer-based health insurance found that differences in behavior between households with two potential sources of coverage and those with one source were influenced by the premium, family size, income, and wealth significantly affect demand. Finn and Harmon (2006) restate the main point that education, income, and health status, to some extent, have a very large effect on the possibility of insuring. In Taiwan, Yamada, Yamada, Chen, and Zeng (2014) examines how the decision to purchase private insurance and hospitalization were made on the household in both Japan and the USA. Then he concluded that there were degrees of the difference of income, socio-demographic factors influenced the decision to purchase private insurance in both countries.

## II. Method

### A. Data Source

This study involved secondary analysis of Indonesia Socio economic Survey Q1-2017 (Susenas). Respectively, Susenas was the largest scale cross-section data of socioeconomic survey in Indonesia collecting individual and household data. It conducted by the Central Statistics Agency since 1963. The Sample was recruited using multistage stratified random sampling and was represent the household in each district. *In the first stage*, the sample size specified using *probability proportional to size method* based on the number of households from census 2010. *The second stage*, the block of household selection. Each block sample consists of 80 to 120 households or residential buildings. Third stages, setting up the sampling frame. To each block, systematically assigned 10 household sampling. SusenasQ1-2017 collected information from 297,276 households spread in all provinces in Indonesia.

In this study, the criteria for medium-scale adopted ASEAN Development Bank criteria, the household expenditure of US \$ 2 - US20 per capita per day. There were two approached to define middle-class households, the relative approach, based on the household income distribution of each country

(Birdsall, Nancy, Graham, & Pettinato, 2000; Easterly, 2001; Thurow, 1970) and the absolute approach, specify the middle class based on income threshold (Bussolo, De Hoyos, Medvedev, & Van Der Mensbrugge, 2007; Milanovic, 2001)

### B. Measure

In this study, Private health insured households (variable name, z) were defined as households that have one or more members who get protection from private health insurance. The variable Z was a dichotomous variable of value 1 for insured and 0 for not insured. A smoking household was defined as a household with one or more members smoking cigarettes and tobacco in the last month of the survey. Head of households who reported that they had never smoked manufactured cigarettes or never used any tobacco products were categorized as “Not A Smoking Household”. Those who reported having ever smoked manufactured cigarettes were asked, “during the past month, did you smoke using an electric cigarette”, and the question “during the past month, did you smoke tobacco”. These questions were asked for each household member. To validate these questions, the head of the household was asked, “during the past month, how many cigarettes have smoked on average”. Socio-demographic data included the highest level of household head education (elementary level, high school, and diploma/university), Household head of employment status (employed; not employed) and the household size.

### C. Statistical analysis

Descriptive analysis was conducted to explore the socio-demographic characteristics of the smoking household and private health insurance enrolment. A logistic regression model was fitted to examine the association between participate in private health insurance and smoking, education level, area of residence, employment status and household size. Logistic regression is an analytical method used to find the relationship between response variables that

were dichotomous or binary with one or more predictor variables (Gujarati & Porter, 2009; Hosmer Jr, Lemeshow, & Sturdivant, 2013). Response variables consist of two categories; 1 if the household enrolls in private health insurance and 0 if not enroll in private health insurance.

$$\begin{aligned}
 Z_i &= \text{Ln} \left( \frac{p}{1-p} \right) \\
 &= \beta_1 + \beta_2 \text{Smoke}_i + \beta_3 \text{Edu}_{1i} \\
 &\quad + \beta_4 \text{Edu}_{2i} \\
 &\quad + \beta_5 \text{Emp}_i + \beta_6 \text{Fam}_i + \varepsilon_i
 \end{aligned}$$

where  $Z_i$  was log odd, probability of insured middle-class.  $\beta_1$  represent log odd of  $\text{Smoke}_i, \text{Edu}_{1i}, \text{Edu}_{2i}, \text{Emp}_i,$  and  $\text{Fam}_i$  when equal with zero.  $\beta_2, \beta_3, \dots, \beta_7$  was the logistic coefficient for each variable.

## III. RESULT

### A. Descriptive Analysis

#### a. Middle-Class Household in Indonesia

Table 1 represents an overview of the middle-class characteristics of Indonesia in 2017 (N = 156,980). Supplementary, table 1 also represents the overall sample characteristic. The number of Indonesian households was around 61.3 million, of which around 52.8 percent are middle-class households. These middle-income households were spread almost evenly in urban areas (51.7 percent) and in rural areas (48.3 percent). The low-middle class was the largest (67.8 percent), almost 6 - 7 out of 10 of Indonesia's middle-class. In general, low-middle classes stay in rural areas. The economic condition was vulnerable to financial risks that occur due to illness (health shock). The mid-middle class was around 29.3 percent or one-third of the total middle-class households in Indonesia. Most of them stay in urban areas. While the high-middle class proportion was very small (2.9 percent) and most domiciled in urban areas.

The highest level of middle-class education was elementary, while found 389.9 percent family head of middle-class education did not attend school. Middle-class with high school and

diploma/university grade was only 29.8 percent and 13.3 percent. The level of education has an important role related to decisions in household resources allocation and capacity building for healthy behavioral preferences. Cutler and Lleras-Muney (2006) finding and confirmed by both Fletcher (2015), education had an influence on the

health status of household members and healthy living behavior and Folland, Goodman, and Stano (2016), that education significantly influences the ability of households to allocate their resources and make decisions to avoid the risk of illness.

Table 1. Middle-class characteristic of Indonesia in 2017

	Middle Class	Smoking Household
	%	%
<b>Indonesia</b>	52,8	49,9
- Low-Middle Class	67,8	72,1
- Mid-Middle Class	29,3	25,9
- High-Middle Class	2,9	2,0
<b>Highest Completed Education level</b>		
Not attended school	17,9	15,7
Elementary school	38,9	26,9
High school	29,8	48,1
College/University	13,3	9,2
<b>Residence</b>		
Urban	51,7	46,5
Rural	48,3	53,5
<b>Employment Status</b>		
Employed	86,8	94,7
Not Employed	13,2	5,3
<b>Participate in PHI</b>		
Yes	8.21	7.25
No	91.79	92.75
<b>Type of Cigarette</b>		
Electric	-	0,2
Tobacco	-	92,7
Electric and Tobacco	-	7,1
<b>Household Size</b>		
< 3	29,51	22,03
3-6	67,31	74,81
7-10	3,10	3,09
> 10	0,001	0,21

Among smoking household and not smoking household, Total respondents are 78,469 and 78,511  
Source: Indonesia Survey Social Economic, Q<sub>1</sub>-2017

*b. Smoking Middle-Class Household Expenditure*  
Smoking is a behavior that has a negative impact on health. Studies conducted by Jacobson et al. (1994) found that smoking during the pregnancy

process was positively correlated to the reduction in birth weight, length, and head circumference. Active and long-term smokers in the age 35-64 years lead to a 50% risk of death compared to the nonsmoker of the same age (Yürekli, Dewi, de Beyer, Cornelia, & Hohnen, 2004). Various other studies had found that smoking affects the quality of life, increases the risk of cancer, heart disease, and stroke. The number of medium smokers households reached 49.9% in 2017 (table 1).

In Indonesia Middle-class, most of the smoker domiciled in the rural area and come from low-

middle-class (72.1 percent). The proportion of high middle-class which smoking behavior only 2.0 percent. Table 2 presents an overview of the expenditure of smoking middle-class in Indonesia (valid N = 23,397). Household allocated for buying cigarettes USD 368.34 per month with a range of USD 59.23 - USD 3,442.20. it was 10.7 percent of monthly expenditure. Comparing with non-food expenditure, cigarette cost reached 24.8 percent. While, allocation of income for health care services was only around USD 4.25 per year, with standard deviation USD 34.49, much smaller than cigarette cost for a month.

Table 2. Smoking middle-class household expenditure of Indonesia in 2017 (USD)

	Mean	SD	Range of spending	
			Minimum	Maximum
Household expenditure per month	368.34	216.88	59.23	3,442.20
Food Consumption per month	208.77	96.03	28.36	1,483.89
Non-food consumption per month	159.58	152.78	7.04	3,031.67
Cigarette spending per month	39.58	28.90	0.60	514.29
Out of pocket for health care services for a year	4.25	34.49	0.00	2,856.62

Abbreviation: SD, Standard Deviation, Valid N = 23,397, 1 USD = IDR 13,300

Source : calculated. Indonesia Social economic survey, Q1-2017

### C. Participation in Private Health Insurance

Compared to other countries. Indonesian household participation in private health insurance was very small. In Brazil, more than 25 percent of the population is covered by private health insurance. 35.0 percent of the formal employment were covered, while 8.5 percent of informal workers were covered by private health insurance. In Thailand, participation in voluntary health insurance reached 17.5 percent in 2000. As well as participation in Turkey where three out of five residents were insured through group insurance schemes (Preker, Zweifel, & Schellekens, 2010).

Most of the health insured households in Indonesia stay in the urban area (73.3 percent). consumers consider the availability of infrastructure and health care facilities. in urban areas, consumers have more preference for health services than in rural areas. That was in line with Ayitey, Nketiah-Amponsah,

and Barimah (2013) findings. Ayitey confirmed that the availability of modern health service facilities is significantly correlated with insurance decisions. The more availability of modern health service facilities will encourage households to buy insurance.

Further, it was found that the insured middle-class had more members than un-insured middle-class household. Averagely, the number of insured households was 3.7 people with the age of head of the families around 45.7 years old. The education of family heads is closely related to household decisions on healthy behavior. Households with higher education have a better probability of ensuring that every household member receives health services and protection. One of them was guaranteed to get health services through health insurance participation. Around 70.1 percent of the

insured head of the middle-class had a high education level (Table 3).

Tabel 3. Health insured middle-class Characteristics of Indonesia, 2017

Karakteristik	Keterangan
Household size	3,7
Ages	45,7
Highest level of Education	Senior high school
Most of the main job	employed
Most of the job sector	Manufacture
Average of Insurance payment monthly	405.163,3

Source: calculated. Indonesia social-economic survey, Q<sub>1</sub>-2017

Around 67.1 percent of the insured head of the middle-class work as an employee and around and 19.9 percent work independently. Health insurance enrolls scheme through the workplace, knows as employment-based health insurance presumed was the factor influence, high participation workers, in private health insurance.

Other research findings proved that health employee-based health insurance encourages increased private health insurance enrollment. In developed countries, In developed countries, households tend to purchase health insurance through employee-based health insurance schemes.

In Great Britain, expansion to health insurance participation from 3.6 million in 1980 to 6.8 million in 1998, two-third of them applied from employee-based insurance. Employee prefers to purchase insurance through employment-based health insurance rather than purchase independently. Using this scheme, employees who were eligible to enroll prefer to purchase for two reasons; *first*, collective insurance purchased avoid adverse selection and reducing premium paid (Colombo & Tapay, 2004). *Second*, cost-sharing among employees, company subsidies and reducing income taxes paid (Bundorf,

2002; Gruber & McKnight, 2003; Stavrunova & Yerokhin, 2014).

### B. Logistic analysis

Using the logistic model, this study found that smoking represents the risky behavior of the middle-class negatively influenced the probability of private health insurance enrolment. Z-Wald value smoking was -15.44, mathematically it can be calculated by dividing the coefficient ( $\beta$ ) against its standard error ( $SE\beta$ ), or can be written;

$$Z_{Wald} = \left[ \frac{\beta_j}{SE_j} \right],$$

$$= -0,3010 / 0,0195$$

$$= - 15,44$$

The probability of smoking influenced private health insurance enrolment 0.74 times lower than not smoking. Mathematically, the odd value can be calculated as;

$$Z_i = Ln \left( \frac{p}{1-p} \right) = e^{-0,1266}$$

$$= 2,718^{-0,3010} = 0,740$$

The output of the logistic regression was represented in Table 3.

Table 1. The output of the Logistic Model

	Coef	Odds.	SE	Z	[95% CL]	
Constant	-3.65773*	0.740	0.014435	-15.43	0.71226	0.76886
smoke	-0.30108*	2.108	0.052960	29.7	2.00708	2.21476
Edu <sub>1</sub>	0.74591*	2.555	0.077398	30.97	2.40773	2.71130

Edu <sub>2</sub>	0.93806*	3.306	0.069512	56.88	3.17293	3.44549
employee	1.19586*	1.078	0.007880	10.32	1.06301	1.09390
JAR	0.07543*	0.026	0.000798	-118.23	0.02427	0.02740
<i>Pseudo R<sup>2</sup> = 0.0869</i>		<i>LR chi2 (5) = 7737.91</i>		<i>Prob &gt; Chi<sup>2</sup> = 0.0000</i>		

Abbreviation: SD, Standard Deviation, SE, Standard Error, Z, Z Value, CL, Confidence Interval

\*denotes statistical significance at 1 percent level. Valid N = 156,980

Source : calculated. Social economic survey, Q<sub>1</sub>-2017

This finding is contrary to the theoretical hypothesis. Theoretically, smoking causes a higher risk of illness and decreases health stock. The higher the risk of illness, consumers will tend to consume insurance as part of financing health protection. Education, household size and employment status variables were found to be significantly positive affecting insurance participation. The probability of a high-educated middle-class to insure was 0.74 times higher if the education of family heads is elementary, whereas if the education of family heads is at the diploma/university, the probability to participate in private health insurance increase to 0.94 times. This shows that with higher education in the middle class, it would increase the probability of purchase private insurance. In line with that, the household size of the middle-class influenced the probability of insured 0.07. Whereas family heads who work as an employee increased the probability of insured by 1.19 times.

#### IV. DISCUSSION

The findings in this study proved that smoking habits and demographic factors in the middle-class play an important role in insurance purchasing decisions. Using 156,980 household data of Indonesian socio-economic surveys, this study aims to determine the effect of smoking behavior on the middle-class on private health insurance enrollment. Using the logistic model, the study found that demographic factors have a positive effect while smoking behavior negatively influences the probability of private insurance enrollment. Smoking impacts addiction as well as the risk of specific diseases, which require a relatively large cost of health care, catastrophic health spending. The risk of disease with high out of spending would

increase the cost of premiums paid by consumers. It drove consumers to prefer a partial insurance protection scheme, limited to the types of diseases caused by smoking behavior. Theoretically, this phenomenon is known as Advantageous selection, which is the contra condition of adverse selection in insurance (De Meza & Webb, 2001; Fang, Keane, & Silverman, 2008). Adverse selection implies that individuals with a higher risk of illness will prefer a type of insurance with comprehensive coverage of protection. This research finding was in line with Buchmueller et al. (2008). Using 25,906 respondents from the National Household Survey 2004-2005, Buchmueller found a negative correlation between smoking behavior and insurance participation at a 95% confidence level.

Risk perception plays an important role in insurance decisions. Addicted smokers had different perceptions of smoking effects. Both Viscusi (1991) and J.-T. Liu and Hsieh (1995) found that risk perception of young people overestimated to a larger degree than older people. Non-smokers also overestimated the risks to a higher degree than former smokers, who in turn overestimated risks to a higher degree than smokers. Other studies conducted by Antoñanzas et al. (2000) in Spain and Viscusi (1990) in the US found that several other risks associated with smoking were overestimated. Household size has a positive effect on the probability of buying insurance. Refer to Grossman (1972) point of view, demand for children was a rational decision in the household. Increasing the number of household members was directly proportional to increase healthcare utilization to ensure the health status of each household member remains in good condition. This has an impact on increasing out of pocket. To avoid this risk,

households tend to purchase health insurance. This finding was in line with Abraham et al. (2002) who used health expenditure data, found that family size, income, and prosperity significantly influenced the type of insurance the company offered.

Middle-class with better education generally more in health as well. There was a significant education effect in most regressions. Indeed, the education effect was large. In this study, we found that the education of family heads, both high school or diploma/university had a significant and positive effect on insurance enrollment probability. Affecting of education to a better health status could be through self-awareness and self-reporting. Both Adam Wagstaff (1993) and Zhao (2008) argued that self-reporting had a significant positive effect on the utilization of health services. In 2009, Geda and Khanam confirmed Wagstaff's statement. Furthermore, Enhancement in the utilization of health care services would increase the demand for health insurance (H. Liu & Zhao, 2014; Tennyson & Yang, 2014; A. Wagstaff, Lindelow, Jun, Ling, & Juncheng, 2009).

#### V. CONCLUSION

Demographic factors and smoking behavior have been proven to significantly influence the probability of middle-class to participate in private health insurance. All demographic variables were used in this study, have a positive effect on the probability of insurance enrollment, while smoking had a negative effect. This was probably caused by misperceptions about the effects of smoking. This finding emphasized the findings of Viscusi (1990), J.-T. Liu and Hsieh (1995) and (Antoñanzas et al. (2000)). Furthermore, the possibility of advantageous selection appears in the demand for private health insurance in smokers of middle-class households in Indonesia. Our findings suggest an increase in consumer awareness of risk behavior through improved education levels. In addition, it was deemed necessary to diversify health protection schemes according to the types of risks faced by consumers.

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