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THE DETERMINANTS OF BEING A CIGARETTE SMOKER: AN EXPLORATORY STUDY IN PENANG, MALAYSIA

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ABSTRACT

Primary objective of this paper is to examine the socio-demographic determinants of being a cigarette smoker in Penang, Malaysia, via using a microeconometric approach. The analysis is based on the primary survey data, with a total of 398 respondents. Findings illustrate that males, Malays, employed individuals and alcohol drinkers are positively associated with the likelihood of cigarette smoking, whereas, Chinese and those of highly educated are negatively correlated with the likelihood of cigarette smoking. However, age, income and marital status do not possess any significant impacts on the likelihood of cigarette smoking. In conclusion, this paper has shed new light on the determinants of cigarette smoking among the adults in Penang. The findings of present study appear to be very useful for the policymakers.

Keywords: cigarette; demography; determinant; Malaysia; smoking

1. INTRODUCTION

Nowadays, cigarette smoking has become a critical issue worldwide, which needs to be given urgent attentions. It is estimated that 33% of the men globally are cigarette smokers and about one out of five adolescents has smoking behaviour (World Health Organization, 2002). Worst of all, about 80,000 to 100,000 of adolescents start smoking every day. Besides, World Health Organization (2002) also demonstrated that one out of ten adults die daily is due to cigarette smoking, which amounts to approximately 4 million of deaths worldwide. These figures are predicted to be doubled to around 10 million by 2030, and there will be one out of six people die daily due to smoking (World Health Organization, 2002).

In Malaysia, the issue of cigarette smoking is getting more and more serious in this age of industrialization (Ross and Al-Sadat, 2007). World Health Organization (2002) reported that approximately 50% and 30% of Malaysian men and adolescent boys are cigarette smokers, respectively. In terms of smoking related mortality, Malaysia has a total of 10,000 deaths annually in the past three decades, and these figures are anticipated to reach 30,000 in the near

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future (Ministry of Health, 2003). Ross and Al-Sadat (2007) stated that 19% and 11.5% of mortality among the males and females, respectively, are due to cigarette smoking. Furthermore, cigarette smoking has brought about more than half a million of coronary diseases in the past five years (World Health Organization, 2002).

Considering the serious adverse impact of cigarette smoking on health and country development, public health authorities of Malaysia have implemented several policies to discourage and reduce the use of tobacco products. Among them are prohibit all sorts of cigarette advertisements, transform all the public areas into non-smoking zone, increase the taxes on cigarette products, as well as, organize several nationwide anti-cigarette smoking campaigns to the community. Unfortunately, these policies do not seem to be very effective. It appears, therefore, that there is still a need for government to improve its policies to overcome these serious woes.

To date, there is a growing of empirical studies on the determinants of cigarette smoking in developed countries. However, only a little consideration is given to the context of developing countries. Since the prevalence of cigarette smoking is on the rise in the developing countries, it is worthwhile to conduct researches on this topic in the developing nations, notably East Asia Region, where the smoking rate is one of the highest in the world (World Health Organization, 2002). To the best of our knowledge, only three in-depth studies have been conducted in Malaysia thus far, namely Lim, Amal, Hanjeet, Mashod, Wan Rozita, Sumarni et al. (2006), Khairani, Norazura and Zaiton (2007) and Lim, Sumarni, Kee, Christopher, Noruiza Hana, Lim et al. (2010). In fact, all of these studies have the common limitation that only focus on the smoking behaviours among the selected adolescent cohorts in certain district of the states (i.e. Kota Tinggi, Hulu Langat, Petaling). Hence, it is apparent that their findings are too limited and not very useful for policy implication.

In view of these literature gaps, present study attempts to create three substantial contributions to the existing knowledge on the determinants of cigarette smoking. First, present study uses a more comprehensive data that consist of various age, income and education groups of individuals for analysis. Second, present study uses a rigorous micro-econometric manner to examine the factors affecting the likelihood of smoking. Third, Penang sample is used in present study given that Penang has a distinct ultimate goal of becoming a "smoke free" state (The Star, 2010). Therefore, a better understanding of its populations' smoking behaviour is useful for the policy makers. In sum, the primary objective of present study is to empirically investigate the influencing factors of smoking in Penang, Malaysia.

2. INSIGHTS FROM THE LITERATURE

Previous studies had consistently found that age was significantly associated with the likelihood of smoking. As exhibited in the study by Aristei and Pieroni (2008), older households were less inclined to smoke compared to the younger households. Yen (2005) and Bilgic, Florkowski and Akbay (2010) also found that as individuals grew older their preferences for smoking would reduce. This was because older individuals were more aware of their health, and thus were more inclined to avoid smoking. On the other hand, Raptou, Mattas, Tsakiridou and Katrakilidis (2005) indicated that age could not affect the odds of smoking.

Literature showed that there were gender differences in smoking behaviour. Hersch (2000) and Manrique and Jensen (2004) illustrated that men had higher propensity to smoke in relative to women. This was because woman smoking was not a socially acceptable behaviour in the society. On the other hand, Raptou et al. (2005) and Aristei and Pieroni (2008) observed that women were more likely to smoke as compared to men. Perhaps, this was due to the influence of media that caused women to smoke in order to achieve their thin-ideal body image (Waldron, 1991).

Education was consistently found to have significant impact on the likelihood of smoking as higher educated individuals are less likely to smoke (Kenkel, 1991; Tansel, 1993; Hersch, 2000; Yen, 2005; Aristei and Pieroni, 2008; Bilgic et al., 2010). The reason was that individuals with higher education background tended to have better health knowledge, and thus were likely to be more aware of the risks of cigarette smoking.

In terms of income, studies by Manrique and Jensen (2004) and Raptou et al. (2005) indicated that income was positively associated with the probability of smoking, hence so was the amount of money spent on tobacco products (Bilgic et al., 2010). This evidence suggested that tobacco was a normal good, thus the poor would tend to face more barrier to consume. However, there were also evidences claiming that higher income individuals were less likely to smoke (Hersch, 2000; Bauer, Gohlmann and Sinning, 2007). This was due to those with higher income valued their future more than those with lower income.

Marital status was found as another determining factor of smoking. As pointed out by Hersch (2000), unmarried individuals had a greater propensity to participate in cigarette smoking than the married individuals. Lack of social support from the spouses, as well as, the presence of life stresses could be the main reason causing the unmarried to smoke. Cho, Khang, Jun and Kawachi, (2008) also ascertained that cigarette smoking was more prevalent among the unmarried individuals. Besides, Bilgic et al. (2010) claimed that marriage could alter individuals' smoking behaviour.

With regard to employment status, its impact on smoking appeared to be mixed. As revealed in the studies by Manrique and Jensen (2004) and Bilgic et al. (2010), employed household heads had a lower likelihood of smoking compared to their unemployed counterparts. Bilgic et al. (2010) claimed that employed individuals often had less opportunity to smoke than the unemployed given that cigarette smoking was prohibited in the workplaces. A similar outcome was observed in the study by Lee, Crombie, Smith and Tunstall-Pedoe (1991). Specifically, the study found a relatively high amount of smokers among the unemployed individuals. However, Bauer et al. (2007) argued that individuals who were in the labour force were more likely to smoke as compare to the unemployed.

In reference to alcohol consumption, Bilgic et al. (2010) found a positive relationship between the number of alcohol drinkers in a household and the amount of cigarette consumed. Similarly, Dee's (1999) emphasised that tobacco and alcohol were complementary goods. Consistent with the findings by Aristei and Pieroni (2008), individuals who spent a lot of money on alcohol had a higher tendency to participate in cigarette smoking. The notion was that individuals who

lived an unhealthy lifestyle were usually less concerned about their own health, and consequently were more likely to indulge in cigarette smoking compared to those lived a healthy lifestyle (Raptou et al., 2005).

3. METHOD

3.1. Data

Data used in present study was collected based on convenient sampling method. The survey was carried out in several places in Penang such as shopping malls, offices, cafes and residential areas. The survey period was from August to October, 2010. Self-administrated questionnaires were distributed to the respondents who aged at least 21 years and above (legal age to purchase tobacco), and had been residing in Penang for at least 12 months. In order to facilitate surveys with different ethnic backgrounds, the questionnaires were prepared in two languages (*Bahasa* Malaysia and English). During the survey, respondents were asked "Do you currently smoke any cigarettes products?" Respondent who answer "yes" was referred as smoker, whereas "no" was non-smoker. On top of that, respondents' socio-demographic profiles were also recorded. A total of 415 respondents were canvassed, but after rejected those with incomplete information, the remaining 398 were retained for final analysis via Stata statistical software. Despite of the small sample size, it was still able to represent the population in Penang.[1]

3.2. Econometric specification

The dependent variable of present study is included in the current model as binary variable. A value of 1 is coded if the respondent is a smoker, 0 if non-smoker. Based on Greene (2007), the logit model is suitable for this analysis as it can predict the probability that lies between the unit intervals. In general, the logit model is expressed as follow:

$$\log \frac{P}{1-P} \alpha + \beta X + {}_i\varepsilon_i \qquad (1)$$

where, P = the probability that a respondent participates in smoking; 1 – P = the probability that a respondent does not participate in smoking; P/(1 – P) = the odds that a respondent participates in smoking; X = explanatory variables which are expected to explain or predict the probability to smoke; β = coefficients for the explanatory variables; and ε = error term.

3.3. Variables

Since there is currently a lack of empirical studies on the determinants of cigarette smoking in Malaysia, the explanatory variables that used in the present study follow closely the previous studies that have been conducted elsewhere.[2] As such, respondent's socio-demographic

[1] Given Penang has a total of 1,609,900 population, minimum sample size of 384 respondents is estimated based on 95% of confidence level and the assumption of 50% of population are cigarette smokers (SERI, 2010).

[2] Studies that are discussed in the literature review section (section 2)

characteristics such as age, gender, ethnicity, marital status, employment status, education, drinking status and income are included in the current model for examination (Table 1).

Table 1: Definition of variables in the statistical model

Variables	Definition
Dependent variable	
Smoker	Respondent is a current smoker (1 = yes, 0 = no)
Explanatory variables	
Age	Respondent's age (years)
Gender	Respondent is male (1 = yes, 0 = no)
Malay	Respondent is Malay (1 = yes, 0 = no)
Chinese	Respondent is Chinese (1 = yes, 0 = no)
Indian/other*	Respondent is Indian/other (1 = yes, 0 = no)
Marital status	Respondent is married (1 = yes, 0 = no)
Employment	Respondent is employed (1 = yes, 0 = no)
Tertiary	Respondents has tertiary education (1 = yes, 0 = no)
Drinker	Respondent is a alcohol drinker (1 = yes, 0 = no)
Low*	Respondent's monthly individual income is RM 0 – 999 (1 = yes, 0 = no)
Lower-middle	Respondent's monthly individual income is RM 1000 – 2999 (1 = yes, 0 = no)
Upper-middle	Respondent's monthly individual income is RM 3000 – 5999 (1 = yes, 0 = no)
High	Respondent's monthly individual income is ≥ RM 6000 (1 = yes, 0 = no)

Notes: *Refers to reference group

In the current model, only age is included as a continuous variable, whereas others are included as binary variables. Gender is included as 1 for male, 0 for female. Ethnicity is categorized as: Malay, Chinese and Indian/other (reference group). Marital status is indicated as 1 if the respondent is married and 0 if single/divorcé/widow(er). Employment status is divided into 1 if the respondent is employed, 0 if unemployed (e.g. student, housewife, retiree, non-paid work and unable to work). Respondent's education background is coded as 1 if he/she has tertiary education and 0 if he/she has secondary or primary. In term of drinking status, respondent who is an alcohol drinker is grouped as 1 and 0 otherwise. Respondent income is categorized as: low [RM 0 – 999 (reference group)], lower-middle [RM 1,000 – 2,999], upper-middle [RM 3,000 – 5,999] and high [≥ RM 6,000].

3.4 Characteristics of survey respondents

Out of the total 398 respondents, 58 (14.57%) are smokers and 340 (85.43%) are non-smokers. Mean age of the overall respondents is about 37 years. In terms of gender, 44% of the total sample are males. The ethnic breakdown consists of 38% Malays, 41% Chinese and 21% Indian/other. These ethnic and gender structures follow closely the composition of Penang population which consists of 41.6% Malays, 40.9% Chinese, 17.5% Indians/others, and 49.3% of males (SERI, 2010) (Table 2).

Table 2: Descriptive statistic of variables in the statistical model

Variables	Smoker (n = 58)		Non-smoker (n = 340)		Total sample (n = 398)	
	Mean (%)	Std. Dev.	Mean (%)	Std. Dev.	Mean (%)	Std. Dev.
Age	35.34	11.66	36.77	13.90	36.56	13.59
Gender	91	-	36	-	44	-
Malay	58	-	34	-	38	-
Chinese	21	-	44	-	41	-
Indian/other	21	-	21	-	21	-
Marital status	47	-	50	-	50	-
Employment	91	-	75	-	78	-
Tertiary	48	-	68	-	65	-
Drinker	45	-	30	-	32	-
Low	26	-	33	-	32	-
Lower-middle	47	-	45	-	45	-
Upper-middle	24	-	18	-	19	-
High	3	-	4	-	4	-

Notes: For continuous variable, the value refers to mean, whereas for binary variables, the value refers to percentage.

Table 3: Results for logit analysis of cigarette smoking

Variables	Estimated Coefficient (1)	Odds Ratio (2)	Z-statistics (3)
Constant	-5.4375 (1.2889)	-	-4.22***
Age	0.0044 (0.0210)	1.0044 (0.0211)	0.21
Gender	3.2439 (0.5449)	25.6338 (13.9681)	5.95***
Malay	2.0281 (0.5890)	7.5999 (4.4763)	3.44***
Chinese	-0.9657 (0.5287)	0.3807 (0.2013)	-1.83*
Marital status	-0.7336 (0.4742)	0.4802 (0.2277)	-1.55
Employment	1.4097 (0.7912)	4.0947 (3.2397)	1.78*
Tertiary	-1.2055 (0.4916)	0.2995 (0.1472)	-2.45**

Table 3: Results for logit analysis of cigarette smoking *(cont)*

Variables	Estimated Coefficient (1)	Odds Ratio (2)	Z-statistics (3)
Drinker	1.9170 (0.5660)	6.8003 (3.8489)	3.39***
Lower-middle	-0.3350 (0.6184)	0.7154 (0.4424)	-0.54
Upper-middle	-0.2584 (0.7327)	0.7723 (0.5659)	-0.35
High	-0.5439 (1.1195)	0.5805 (0.6498)	-0.49
LR χ^2 (11)	119.85		
P > χ^2	0.0000		
Hosmer-Lemeshow χ^2 (8)	12.43		
P > χ^2	0.1329		

Notes: Asymptotic standard errors in parentheses. Asterisks *** indicate significance at the 1% level, ** at the 5% level, and * at the 10% level.

Of the total sample, 50% and 78% of the respondents are married and employed, respectively. With respect to respondents' education background, majority (65%) of them have at least tertiary education. Overall, there are 32% of alcohol drinkers in the sample. Approximately, 32%, 45% and 19% of the respondents are from low, lower-middle and upper-middle income groups, respectively, whereas, only 4% are from high income group.

4. RESULTS AND DISCUSSION

Results for logit analysis of smoking are presented in Table 3, with estimated coefficient in column 1, odds ratio in column 2 and z-statistic in column 3. Likelihood ratio (LR) and Hosmer-Lemeshow tests are conducted to test the robustness of the regression model. The results show that the value of LR Chi-square, with 11 degrees of freedom is 119.85, and is statistically significant. Therefore, the null hypothesis can be rejected, and concluding that the current model is good fit. Moreover, the Hosmer-Lemeshow Chi-square with 8 degrees of freedom is 12.43, and is statistically insignificant. Hence, the null hypothesis cannot be rejected, and further confirming that the current model is very good fit.

The findings of present study demonstrate that there are no age differences in the likelihood of smoking, and thus rejecting the conventional wisdom that older individuals are less likely to smoke. These outcomes conform to the study by Raptou et al. (2005), and conclude that tobacco is an additive substance. As individuals grow older, they will often find it more difficult to quit smoking, although they may be more aware of their own health. In terms of gender, men are

found to have positive impact on the probability of smoking as men are more likely to smoke than women. This outcome is in line with the findings by Hersch (2000) and Manrique and Jensen (2004), and further concluding that women tend to face lower social acceptability for smoking.

The results show that Malays are more likely to smoke than their Indian/others counterparts, whereas, Chinese are less likely to smoke as compared to Indian/others. Based on these findings, one can conclude that individuals' ethnic background can influence their decision to smoke. In other words, different ethnic group of individuals may have dissimilar lifestyle and culture that can, in turn, lead to different preferences for cigarette smoking. On the other hand, contrary to the prior arguments by Hersch (2000), Cho et al. (2008) and Bilgic et al. (2010), marital status does not possess any significant impacts on the likelihood of smoking. As such, it can be concluded that lacking of spousal supports may not necessary result in smoking.

Employed individuals are found to have higher propensity to smoke in relative to their unemployed counterparts. This is consistent with the previous findings by Bauer et al. (2007). These findings somewhat imply that smoking addicted individuals would still follow their usual smoking routine during working hours, even though smoking is prohibited in the workplaces. Nevertheless, these also show that employed individuals are prone to use smoking as a method to relieve their job stresses.

Present study finds that tertiary educated individuals have lower probability to smoke as compared to their counterparts who have only primary or secondary education. This observed outcome is in agreement with the previous studies by Kenkel (1991), Tansel (1993), Hersch (2000), Yen (2005), Aristei and Pieroni (2008) and Bilgic et al. (2010), who also found the inverse relationship between years of education and the likelihood of smoking. Perhaps, this is due to higher educated individuals are more aware of their health, as well as, the danger of smoking.

It is found that drinking is significantly associated with smoking behaviour as alcohol drinkers have higher likelihood of smoking than the non-drinkers. This is in line with the studies by Dee's (1999), Aristei and Pieroni (2008) and Bilgic et al. (2010), who claimed that alcohol and cigarette are complementary in nature. Since alcohol drinkers are less concerned about their own health, they are more inclined to indulge in smoking (Raptou et al., 2005).

Last, income is found to have no significant impact on the likelihood of smoking. This finding contradicts the previous studies by Hersch (2000), Manrique and Jensen (2004), Raptou et al. (2005), Bauer et al. (2007) and Bilgic et al. (2010), who found the significant relationship between income and the likelihood of smoking. As such, imposition of heavy taxes on the tobacco products may not seem very effective in reducing the prevalence of smoking.

5. CONCLUDING REMARKS

In conclusion, present study has found that gender, ethnicity, employment status, education and drinking status are statistically significant in affecting the likelihood of smoking. However, age, marital status and income are found to have no significant impact on the likelihood of smoking. Based on these findings, several policies toward reducing the prevalence of smoking are suggested.

First, in light of the findings that education can reduce the tendency to smoke, government is thus suggested to organise more nationwide health awareness and education programmes to the community. The messages of these programmes can be delivered via using various types of multi-lingual mass media such as newspapers, television programs and radio channels. The main purpose of these programmes is to educate the people about the disadvantages of smoking. Additionally, these suggested programmes should particularly pay more attentions to the Malay ethnic group. This is because Malays are found to have the highest probability to smoke.

Second, government should consider organizing more campaigns to advertise the risks of consuming alcohol to the society. Since both smoking and drinking are complementary in nature, a reduction in the prevalence of alcohol consumption may, in turn, lead to a decrease in smoking prevalence. In addition, medical doctors, physicians and health specialists are recommended to play the role as spokespersons in these campaigns to highlight the consequences of drinking.

Third, owing to imposition of heavy taxes on the cigarette products is not effective in reducing the smoking prevalence, government is therefore suggested to raise the taxes on the complementary goods for cigarette such as alcohol, which possesses the significant impact on cigarette consumption. Beside that, government can also think of using other methods to increase the barrier to use the cigarette products such as limiting the licence to sell and import cigarette products.

Finally, since the prevalence of smoking is higher among the males, the designed anti-smoking programmes directed toward the males may appear promising. Cigarette smoking cessation programs, for instance, should be organized frequently among the male populations. Furthermore, leaders from various ethnic groups are suggested to advertise the risks of smoking to the community, with particular attention on emphasising the fact that smoking related diseases do not discriminate between males and females.

Owing to time and budget constraint, several inherent limitations are noted. First, the collected sample size that used in the present study is quite limited. Hence, it cannot represent the national population as a whole. Second, several explanatory variables that claimed by the previous studies that have significant effect on the likelihood of smoking (e.g. house locality, household size) are excluded in the present study due to limited availability of data. Therefore, suggested future researches should have the data collected in different regions in Malaysia, and take into account of more relevant variables.

REFERENCES

Aristei, D. and Pieroni, L. (2008). A double-hurdle approach to modeling tobacco consumption in Italy. *Applied Economics, 40*(19), 2463-2476.

Bauer, T., Gohlmann, S. and Sinning, M. (2007). Gender differences in smoking behavior. *Health Economics, 16,* 895-909.

Bilgic, A., Florkowski, W. J. and Akbay, C. (2010). Demand for cigarettes in Turkey: An application of count data models. *Empirical Economics, 39*(3), 733-765.

Cho, H. J., Khang, Y. H., Jun, H. J. and Kawachi, I. (2008). Marital status and smoking in Korea: The influence of gender and age. *Social Science & Medicine, 66*(3), 609-619.

Dee, T. S. (1999). The complementarity of teen smoking and drinking. *Journal of Health Economics, 18*(6), 769-793.

Greene, W. H. (2007). *Econometric analysis,* 6th ed. NY: Prentice Hall.

Hersch, J. (2000). Gender, income levels, and the demand for cigarettes. *Journal of Risk and Uncertainty, 21*(2-3), 263-282.

Kenkel, D. S. (1991). Health behavior, health knowledge, and schooling. *Journal of Political Economy, 99*(2), 287-305.

Khairani, O., Norazua, R. and Zaiton, A. (2007). Prevalence and reasons for smoking among upper secondary schoolboys in Hulu Langat, Malaysia. *Medicine and Health, 2*(1), 80-85.

Lee, A. J., Crombie, I. K., Smith, W. C. S. and Tunstall-Pedoe, H. D. (1991). Cigarette smoking and employment status. *Social Science & Medicine, 33*(11), 1309-1312.

Lim, K. H., Amal, N. M., Hanjeet, K., Mashod, M. Y., Wan Rozita, W. M., Sumarni, M. G. and Hadzrik, N. O. (2006). Prevalence and factors related to smoking among secondary school students in Kota Tinggi District, Johor, Malaysia. *Tropical Biomedicine, 23*(1), 75-84.

Lim, K. H., Sumarni, M. G., Kee, C. C., Christopher, V. M., Noruiza Hana, M., Lim, K. K. and Amal, N. M. (2010). Prevalence and factors associated with smoking among form four students in Petaling District, Selangor, Malaysia. *Tropical Biomedicine, 27*(3), 394-403.

Manrique, J. and Jensen, H. H. (2004). Consumption of tobacco and alcoholic beverages among Spanish consumers. *Southwestern Economic Review, 31,* 41-56.

Ministry of Health (2003). *Clinical practice guideline on treatment of tobacco use and dependence*. Ministry of Health, Malaysia.

Raptou, E., Mattas, K., Tsakiridou, E. and Katrakilidis, C. (2005). Factors affecting cigarette demand. *International Advances in Economic Research, 11*(3), 275-290.

Ross, H. and Al-Sadat, N. A. M. (2007). Demand analysis of tobacco consumption in Malaysia. *Nicotine and Tobacco Research, 9*(11), 1163-1169.

SERI (Socioeconomic & Environmental Research Institute) (2010). *Penang statistic*. [Online] Retrieved October 21, 2010, from www.seri.com.my

Tansel, A. (1993). Cigarette demand, health scares and education in Turkey. *Applied Economics, 25*(4), 521-529.

The Star (2010). Penang to be 'smoke-free' state. *The Star,* 27 September.

Waldron, I. (1991). Patterns and causes of gender differences in smoking. *Social Science & Medicine, 32*(9), 989-1005.

World Health Organization (2002). Factsheet: *Smoking statistics*. [Online] Retrieved March 25, 2011, from http://www.wpro.who.int/media_centre/fact_sheets/fs_20020528.htm

Yen, S. T. (2005). Zero observations and gender differences in cigarette consumption. *Applied Economics, 37*(16), 1839-1846.