

## Smoking Behavior among Youth in a Developing Country: Case of Indonesia

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**Abstract:** This paper examines smoking behavior among youth using data from three waves of the Indonesia Family Life Survey (1993, 1997 and 2000). We study the socio-economic factors determining cigarette smoking participation and intensity. Our result shows that parental education has significant, negative effects on smoking participation and smoking intensity of male youth (15-19). The same is true of effects of own education on smoking of adult male 20-59 years old. While income as measured by per capita expenditure (*pce*) does not seem to have significant effect on smoking participation, it does seem to have significant, positive relationship with smoking intensity of adult male 20-59 years old. Using data on household budget shares of tobacco, we obtained an estimate of own price elasticity of tobacco products of around  $-0.8$  after controlling for province and urban (and interaction) fixed effects. Households with *pce* below the median have expenditure elasticity of around 1.2 while the elasticity is around 0.7 for households with *pce* above the median. Using individual level data on cigarette consumption of individuals 15-19 years old, we found that conditional on smoking a positive amount of cigarettes, the price elasticity is around  $-0.3$  when we control for province and urban (and interaction) fixed effects; although price is not statistically significant when we control for province and urban-rural fixed effects.

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## 1. Introduction

While tobacco consumption in high income countries has declined over the past decades<sup>1</sup>, it continues to rise among people in low and middle income countries (World Bank, 1999, 2001). Between 1970 and 1990, tobacco consumption in low- and middle income countries increased by around 3.4 percent per annum (Gajalakshmi et al. 2000) while during the same period, consumption in high income countries was declining. Some studies also suggest that while most smokers in low- and middle- income countries start to smoke by the early twenties, there is a trend toward starting at a younger age (World Bank, 1999).

Studies that have emerged in recent years suggest that some important differences exist between smoking behaviors in developed and developing countries. For example, on average, demand elasticities with respect to price of cigarettes are about  $-0.4$  in high income countries and  $-0.8$  in middle and low-income countries (Chaloupka et al. 2000, World Bank 1999) This suggests that there is large scope of using the price of cigarettes (e.g. through excise taxes) as a tool to reduce smoking in developing countries. It is important to note that the range of elasticities estimated for developing countries is quite wide (Chaloupka et al. 2000, Guindon et al. 2003).

Although studies in both developed and developing countries have put a lot of focus on estimating price elasticities of cigarettes, increasingly attention has also been given to the effects of various socio-economic factors such as education, wealth, and income on smoking behavior. The evidence on the relationship between smoking behavior and socio-economic factors is mixed at best. A review by Bobak et al. (2000) on a number of studies on smoking prevalence shows that in some countries smoking is more common among men from low social economic status (as defined by income, education, occupation, and social class) , while in others, smoking is found to be more prevalent among the more affluent.

It is difficult to assess the existing evidence since most of the analyses on smoking in developing countries, including those reviewed by Bobak et al (2000) have been conducted using either aggregate, time series data, or individual data with very small sample of a very specific demographic group (e.g., school-aged children in a city, etc.), with only limited information collected from the respondents (as also noted by Lance, Akin, Loh, and Dow 2004). The disadvantages of using aggregate data to study smoking behavior are well known, such as high correlation between the independent variables, the difficulty of disentangling the simultaneity between demand and supply determining price, sales, and consumption of cigarettes. Studies using aggregate data are also not particularly useful if one is interested

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<sup>1</sup> For some subgroups in high income countries, consumption actually rose during the 1990s, such as youth in the U.S. (Gruber and Zinman, 2000).

in looking at how smoking behavior is affected by various socio-economic factors such as age, education, and income.

In recent years, there has been studies using household level data that looked at smoking behavior across different demographic, education, and income groups in low-income countries, for example in Egypt (Nassar, 2003), Bulgaria (Sayginsoy et al. 2002), Turkey (Onder, 2000), and Indonesia (Adioetama et al (2005). The results on the relationship between education, income, and cigarette consumption are mixed.<sup>2</sup> However, the studies mentioned above use household level data as opposed to individual level data, and both cigarette consumption as well as education are usually measured at the household level, making it difficult to interpret the correlations between education and cigarette consumption.<sup>3</sup> Also, because these studies are cross-sectional in nature, some unobserved heterogeneity at the regional/community level as well as at the household level that may confound the results could not be controlled for.

The analysis by Lance et al (2002) on the demand for cigarettes in China and Russia circumvents most of the problems above by using household and community level surveys that also collect information on individual smoking behavior. Controls for age, wealth, education, gender, and household size are included in the analysis. They use community fixed effects to control for community-level unobservables that might bias their estimates of price effects.<sup>4</sup> Their findings suggest that price elasticities of cigarettes in China and Russia are much lower than those estimated using aggregate time series data.

Similar to the paper by Lance et al (2002), our paper uses data from a longitudinal household survey with detailed information on smoking behavior in addition to a rich set of household and individual variables. As in the paper by Lance et al (2002) we also calculate price elasticities of cigarettes under different specifications. In addition, we are also interested in looking at the relationship between education and income on smoking behaviour. Understanding how these other socio-economic factors influence smoking behavior is perhaps as important as the knowing the price elasticity of cigarettes. In

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<sup>2</sup> Nassar (2003) finds that in Egypt the expenditure elasticity is higher among people with lower education. For higher educational levels, changes in income have less of an effect on tobacco consumption. Onder (2002) shows that households whose household head is a university graduate are less likely to have a household member who smokes, and conditional on having at least one member who smokes, consume fewer cigarettes. Sayginsoy et al (2002) find that each additional year of education of the most educated household member reduces consumption per capita of cigarettes, although the result does not hold for the lowest income group. More educated households are more likely to have members who smoke (Adioetomo et al 2005).

<sup>3</sup> Sayginsoy et al (2002), using the LSMS data from Bulgaria, use monthly number packs of cigarettes purchased by the household as a measure of cigarette consumption. Maximum education of adults in the household was used as households' level of education. Nassar (2003) and Onder (2000) use household tobacco expenditure and use the household head's education as the measure of a household's education. Adioetomo (2005) use the proportions of household members with elementary and junior high schooling.

<sup>4</sup> .After controlling for community fixed effects they found estimates of price elasticities of between - 0.02 and - 0.113 for China and between -0.02 and -0.176 for Russia.

particular, in the settings where demand elasticities for cigarette are low, it may be important to look at other potential pathways that may affect smoking behaviour. Economic models such as the rational model of addiction predicts that younger, less educated, and those with lower income are more responsive to price of cigarettes, while older, more educated and those with higher income are more responsive to new information on health consequences of smoking (for a review of models of addiction, see, for example, Chaloupka, et al 2000).

Our approach in this paper is non-structural (i.e. we are not going to empirically test the rational model of addiction). Using controls for individual, household, as well as community characteristics, we are examining the relationship between these socio-economic factors and (1) smoking participation, (2) smoking intensity, and (3) how the relationships change over time, focusing primarily on male youth. To analyze the smoking participation and intensity, we employ the two-part model, a very common approach in studying smoking behavior and demand for cigarettes.

The focus on smoking behavior of the younger population is important since initiation to smoking participation likely to begin at a young age. From a policy perspective, it is also important to focus on youth since to the extent that youth smoking has long-term impacts, the welfare consequences of smoking may be large. Biomedical research have also shown that early use of tobacco is associated with higher prevalence of smoking in adulthood and causes greater risk of health problems such as decrease in general fitness, coughing, greater susceptibility to and severity of respiratory illnesses, early development of artery disease, and slower rate of lung growth. If youth smoking is seen as a case of market failure (i.e., inadequate information on health consequences, and addictive nature of cigarette smoking), there may be an efficiency ground for policy intervention.

The rest of the paper is organized as follows. First, we discuss some of the important background information on cigarette consumption in Indonesia. Next, we briefly discuss the data that we are using in section 3, followed by a descriptive analysis of smoking incidence (section 4). In section 5, we discuss the empirical strategy that we are going to employ in the multivariate analysis. Section 6 will discuss the empirical results. Section 7 will discuss cigarette price elasticities from the alternative specifications, and section 8 will conclude the paper.

## **2. Smoking in Indonesia**

With a population of nearly 250 million, Indonesia is the fourth most populous country in the world. According to WHO it is estimated that in 2001, around 69 percent of adult males in Indonesia

smoke cigarette (WHO, 2002)<sup>5</sup>. This number is almost the same as our estimate of 70 percent among adult males (15 and above) in 2000 using IFLS data. Most smokers in Indonesia consume clove cigarettes (90 percent of current smokers, according to IFLS data). Clove cigarettes typically include 60-70% tobacco and the rest cloves. Tests have shown that clove cigarettes contain twice the levels of tars, nicotine and carbon monoxide than do regular (white, filtered) cigarettes (CDC 1985). Clove cigarettes have also been associated with severe lung injury in susceptible individuals (Council on Scientific Affairs, 1988).

Regulations related to smoking in Indonesia are limited and not as strict compared to policies in other countries such as the neighboring Singapore and Thailand. For example, there is still no ban on cigarette sales to minors (see Adioetomo et al 2005 for a discussion on tobacco control in Indonesia). It is sometime argued that the lack of regulations and enforcement is related to the fact that the tobacco industry plays an significant role in the economy. Cigarette taxes account for approximately 95 percent of government excise tax revenue, which accounts for approximately 4 percent of the government overall tax revenue (WHO 2002)<sup>6</sup>. With around 200,000 workers employed in the cigarette manufacturing, the industry is also the second largest employer after the government. Approximately 400,000 persons are employed in tobacco farming, factory, and cigarette vendors (WHO, 2002). In countries where a comprehensive public policy on smoking is lacking, the importance of understanding the factors that affect the use of tobacco at an early age is even more important to assess smoking behavior that, in turn, affects the health and well-being of youth and beyond.

There are still few studies on smoking in Indonesia. Djutaharta and Surya (2003) summarize 46 studies on smoking in Indonesia in recent years. As noted by the authors, one of the visible gaps is the lack of studies using data from national or large-scale surveys. The majority of these studies were case studies on a particular subgroup or in a narrow range of locations. Most of the studies were conducted in the capital city of Jakarta, and only five of the studies use national level data such as the National Health Survey (Surkenas) or the National Socio-economic Survey (Susenas). By looking at data on individuals and exploiting the longitudinal nature of the survey, our paper provides an important contribution to fill the gap.

### **3. Data: Indonesia Family Life Survey**

For the descriptive part of the analysis, we use data from three waves of the Indonesia Family Life Survey (1993, 1997, and 2000). In our multivariate analysis, we will primarily focus on smoking

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<sup>5</sup> From the Indonesia Health Survey (SURKENAS) 2001, conducted by the Central Bureau of Statistics.

<sup>6</sup> Excise taxes vary from 2 to 36 percent depending on types of tobacco products. The VAT rate is 10 percent of retail price (World Bank [2000]).

behavior of males using data from 1997 and 2000. The IFLS is a longitudinal household and community survey that collects a large amount of information from households that include information about their consumption expenditure, income, and assets. It also collects data from each individual on fertility, education, health, as well as migration, and labor market variables. In addition, the survey also collects information on smoking behavior from individuals aged 15 and above. Included in the module on smoking are questions on whether the individual has ever smoked, currently smokes, the type of cigarettes smoked (eg. clove), the quantity of cigarettes consumed, and the price and quantity of cigarettes purchased. It also collects retrospective information such as when the individual started to smoke, and when they stopped, if they ever did.

The first wave of the sample was collected in 1993 and is representative of about 83 percent of the Indonesian population living in 13 of the 27 provinces in the country. Since then there have been two other full sample follow-ups (IFLS2 in 1997, and IFLS3 in 2000) and a follow-up of a 25 percent sub-sample in 1998 (IFLS2+). This paper focuses on youth smoking behavior between 1997 and 2000, using the data from IFLS2 and IFLS3, although we use data from IFLS1 to provide descriptive trends.

Our main sample is male youth age 15-19 in 1993, 1997, or 2000. In addition to the sample of youth, we also look at a sample of adult males aged 20-59. In the regression analysis we only use the samples from 1997 and 2000. The main reason to limit our sample in this way is that the smoking module in IFLS1 did not include information on expenditures and quantities from which unit costs, or prices, could be calculated.<sup>7</sup>

#### **4. Descriptive Evidence**

We first look at the incidence of smoking among individuals age 15 and above in different years. Table 1 shows the frequency current and ever smoking among men and women 15 and above in 1993, 1997 and 2000. Around 77 percent of males above 15 reported to have ever smoked cigarettes in 1993, compared to 69 percent in 1997 and around 70 percent in 2000. The current rates of smoking in all years are only slightly lower than the ever-smoking rates, suggesting that only a small proportion of smokers quit. The smoking rates among women are much lower; in 2000, around 6 percent of women age 15 and above reported to have ever smoked. Most of Indonesian who smoke choose cloves cigarettes: around 90 percent of males who are current smokers.

Although the numbers suggest very little change in smoking rates among males 15 and above between 1997 and 2000, and a small decrease from 1993; if we look closely at males 15-19, the current

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<sup>7</sup> See Frankenberg and Karoly (1995) for full documentation of IFLS1 and Frankenberg and Thomas (2000) for full documentation of IFLS2. See Strauss, et al (2004) for full documentation of IFLS3.

rate of smoking has increased from 32 percent to 37 percent between 1993 and 1997 and to 43 percent in 2000, a very alarming trend.

Table 2 shows the number of cigarettes smoked per day among men and women in different age groups who currently smoke. Men aged 30-49 seems to smoke the most, around 12 cigarettes per day compared to those in the other age groups (a typical pack of cigarettes in Indonesia contains 12). There are no significant changes in the number of cigarettes smoked between 1997 and 2000.

We also have information on the age of first smoking. The information is based on a retrospective question asking respondents: “*at what age did you start smoking on a regular basis?*” The result is shown in Table 3, for people arrayed by their birth-year cohort. In the first column, it is clear that the fraction of men who started smoking by the age of 15 years has increased among younger birth cohorts. Among the cohort of men born between 1981 and 1995, 22.5 percent started smoking by the time they were 15. This percentage is higher compared to those of men born between 1971-1980. Indeed, looking back to older cohorts back to those who were born between 1941-1950, it seems that there has been a steady increase in the percentage of those who started smoking by the age of 15. A similar trend is also evident if we alter the cutoff age, by looking at the percentage of those who started smoking by the ages of 18, 21, and 24.

How important is tobacco in the household budget? Table 4a shows the shares of household budget spent on tobacco.<sup>8</sup> Households in Indonesia spend a considerable percentage of their budget on tobacco. In 1997, on average, around 4.6 percent of household monthly expenditure was spent on tobacco products. The percentage increased to around 6 percent in 2000. As a percentage of expenditure on food, alcohol and tobacco; tobacco products account for 7.3 percent in 1993, 7.9 in 1997, and 9.9 percent in 2000, clearly increasing. Table 4b shows the budget shares from an alternative source, the Susenas consumption module for 1993, 1996 and 1999; for the same 13 IFLS provinces. There are some differences between the two sources, with tobacco shares tending to be a bit higher in the IFLS data. This is due largely to IFLS over sampling urban areas compared to Susenas, where smoking rates are higher.

## **5. Empirical Strategy**

### ***Share of tobacco expenditure***

To see how observed household characteristics and prices affect the share of expenditure on tobacco we first estimate a simple model of tobacco expenditure shares, using the data from IFLS2 and 3. We regress the tobacco expenditure share on maximum years of education among adults in the household, log of per capita expenditure, household composition variables, and on local (log) prices faced by the

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<sup>8</sup> The IFLS collects detailed information on household consumption expenditures, and one of the expenditure items for which we have data on is expenditure on tobacco products. This includes expenditures on cigarettes (regular tobacco and cloves), cigars, as well as tobacco leaves for pipes and chewing.

households.<sup>9</sup> Households with more adult males may have a higher share of expenditure allocated to tobacco products. Expenditure shares on tobacco may also differ according to education of household members, income level (as measured by per capita expenditures), and of course the prices they are facing. The estimating equation is as follows:

$$w = \alpha + \beta \log(m) + \gamma_1 \log(p) + \gamma_2 \log(\pi) + \theta z + \text{error term}$$

where  $w$  = share of expenditure of tobacco,  $m$  = per capita expenditure,  $p$  = price of cigarettes,  $\pi$  = prices of other goods, and  $z$  = household characteristics. We pay particular attention to the coefficients on  $p$ ,  $\beta$  and price of cigarettes,  $\gamma_1$ . We can calculate the expenditure elasticity as  $\eta_m = m/x * \partial x / \partial m = 1 + \beta/w$ , and own price elasticity of cigarette as  $\eta_p = p/x * \partial x / \partial p = -(1 - \gamma_1/w)$ .

We estimate the equation above using several different specifications. First we pool all of the observations and estimate the model without province, urban, or time dummy variables. In the second specification, we add year dummy. In the third specification we add province and urban dummy variables as well as their interactions.<sup>10</sup>

### ***Smoking participation***

To study the determinant of the probability of smoking, we estimate a pooled probit model with currently smoking as the dependent variable, summarized in the following equation:

$$\Pr(y_{jt}=1|\mathbf{x}_{jt}) = \Phi(\mathbf{x}_{jt}\beta)$$

where  $y_{jt}=1$  if individual  $j$  is currently smoking at year  $t$ ,  $t=1, 1997, 2000$ .<sup>11</sup> In the base specification  $\mathbf{x}_{jt}$  consists of age variables, education variables, income variables. Age variables include age and age squared (for the 15-19 sample) or age splines (for the 20-59 sample). We use parental education for the 15-19 sample and own education for the 20-59 sample. We look at the non-linear effects of education, using dummy variables for different categories of completed years of schooling.

Because education might in part reflect household resources we also control for household income. For the income variables we use splines of log per capita expenditure, where the “knot point” is set at log of Rp 150,000 – just above the poverty line. We also include a set of controls for prices which consist of the log of the community-median price of cigarettes, sugar, and cooking oil (see Appendix). In the second specification we add a dummy variable indicating the year of the survey. To capture region-

<sup>9</sup> This specification follows the “almost ideal demand systems” model introduced by Deaton and Muellbauer (1980). See also Deaton (1997) p.231-233.

<sup>10</sup> We have also estimated the model using community dummy variables (village or sub-district level fixed effects) and the interaction between these dummy variables and time dummy variables to control for underlying unobserved community characteristics, including price and price changes.

<sup>11</sup> The model can also be estimated as a population-averaged model. We have done that and the results are very close to the pooled probit model.



specific differences, in the third specification we add province and urban dummy variables and interactions between the two.

Smoking behavior may also be affected by culture or local norms. In order to control for these factors we include language used during interview and religion as additional explanatory variables in the fourth specification. In the last specification, acknowledging the fact that we are adding an endogenous variable, we include a variable indicating whether smoking participation of an individual is affected by smoking participation of other individuals in the household, especially older males, whom the younger male might look up to as a role model. As our measure, we use a dummy variable with a value of 1 if any male household member, older than the respondent, is currently smoking. We also add a dummy variable if there are no older male members in the household. In all specifications, we pool the sample of individuals from 1997 and 2000, correcting the standard errors for clustering at the individual level.

### ***Smoking Intensity***

To examine the factors underlying smoking intensity, we estimate a Tobit model using the number of cigarettes smoked per day as the dependent variable. Our sample includes those who are currently not smoking. We use the same sets of explanatory variables as our estimation of smoking participation. Our base Tobit specification is as follows:

$$y_{jt} = \max(0, \mathbf{x}_{jt}\beta + u_{jt}), \text{ and } u_{jt} | \mathbf{x}_{jt} \sim \text{Normal}(0, \sigma^2)$$

where  $y_{jt}$  is the number of cigarette smoked per day. The vector  $\mathbf{x}_{jt}$  includes the same variables as in our smoking participation regressions.

In addition to the Tobit specification, we also estimate smoking intensity by using OLS, but only using the sample of those who smoke a positive amount of cigarette per day, hence using a 2-part model.

### ***Smoking Participation and Quitting Behavior of Panel Respondents***

In addition to estimating smoking participation using the pooled probit for the 1997 and 2000 individuals, we exploit the longitudinal nature of the data by looking at the same individuals who were interviewed in both 1997 and 2000. Again we analyze two different groups of individuals: those who were 15-19 in 1997 (and thus were 18-22 in 2000) and those who were 20-59 in 1997 (23-62 in 2000). We estimated the probability of current smoking in 2000 conditional on not smoking in 1997, also the probability of not smoking in 2000 conditional on smoking in 1997. Note that the sample of those who were not smoking in 1997 and is a selected sample, and so is the sample of those who were smokers in 2000. We considered estimating a selection-corrected probit estimation of smoking in 2000 with the selection equation predicting not smoking in 1997, but we could not find variables that could convincingly satisfy the exclusion restrictions.

Understanding the limitations of the exercise, we analyze smoking take-up by estimating:

$$\Pr(y_{j2}=1 | \mathbf{x}_{j1}, k_{j1}=1) = \Phi(\mathbf{x}_{j2}\beta) = \Phi(\mathbf{x}_{j2}\beta + u_{2j})$$

where  $y_{j2}=1$  if individual  $j$  smokes in 2000.<sup>12</sup> Conditional on not smoking in 1997, smoking in 2000 is modeled as a change equation, so the vector  $\mathbf{x}_{j2}$  contains changes in the explanatory variables.<sup>13</sup> We also estimate the model with lagged variables (1997 characteristics) instead of the changes. We analyze quitting behavior using the similar approach.

## 6. Empirical Results

### *Share of tobacco expenditure*

Table 5 shows the results of estimating the share of expenditure on tobacco following equation (1). The first thing to note is that the number of males 15 and above vary positively with the share of tobacco, consistent with the high rate of incidence of smoking among adult males. The impact of having more males between 25 and 59 is higher than for younger males, 15-24. The coefficients on the per capita expenditure variables are statistically significant, with positive signs for lower income households and negative signs for the higher income households. We use the coefficients from the specification in column 4, where we include all the prices and also dummy variables for province and urban-rural regions and their interactions, to calculate the expenditure elasticities. The expenditure elasticity is 1.3 for those with income less than the median and 0.8 for those above (remember a positive coefficient on income in a share equation means the good is a luxury, a negative coefficient is quite consistent with being a normal good).<sup>14</sup>

While tobacco is a normal good, its relationship with the maximum years of schooling of an adult male and an adult female is negative and statistically significant. Households with better educated adults are likely to have lower tobacco shares than other households, holding *pce* constant, with better educated males having a stronger impact than females. This suggests that enough is known in Indonesia about smoking and its ill-health effects that more schooling does have the negative impact that one would see in the US, for example.

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<sup>12</sup> Ideally, to correct for selectivity, we should consider the following selection equation determining whether the individuals smoke or not in 1997:

$$\Pr(k_{j1}=1 | \mathbf{z}_{j1}) = \Phi(\mathbf{z}_{j1}\gamma) = \Phi(\mathbf{z}_{j1}\gamma + u_{1j})$$

where  $u_1 \sim \text{Normal}(0,1)$ ,  $u_2 \sim \text{Normal}(0,1)$ , and  $\text{corr}(u_1, u_2) = \rho$ . The dependent variable  $k_{j1}=1$  if the individuals are *not* currently smoking in 1997. In order for the identification not to depend only on the non-linearity of the probit model, vector  $\mathbf{z}_{j1}$  should include variables that are excluded from the smoking participation equation in 2000.

<sup>13</sup> We use variables from the year of the survey, except for the age variables where we use age in 1997.

<sup>14</sup> We also estimate the model separately by year, and the elasticity estimates are quite similar to the pooled specification. However, a plot based on a smoothed LOWESS regression of the share of tobacco out of food, alcohol, and tobacco on *pce* by year suggest that while in both years there is an inverted-U shape as *pce* increases, the turning point occurs at much higher *pce* in 2000 than in 1997 (See Appendix Figure 1)

The price of cigarettes is statistically significant and positively associated with the expenditure share of tobacco, though with a coefficient on log prices of less than one. The own-price elasticity of cigarettes is thus around -0.84. If we use controls for community dummy variables in place of province and urban interactions, the elasticity is slightly higher at -0.87. These numbers are somewhat lower than the elasticities calculated by Erwidodo, Molyneaux, and Pribadi (2002) using data from the 1999 Susenas. Using a specification similar to ours, they find that the own-price elasticity of tobacco and cigarettes is around -1.03. Our estimates are higher than those found by Adioetomo et al (2005), also using the 1999 Susenas; their findings suggest a price elasticity of -0.61. However, as we will see, from our estimation on smoking intensity using individual level data, we obtain price elasticities that are much lower in absolute value.

### ***Smoking participation***

One of the main goals of this paper is to examine the underlying socio-economic factors determining the probability of smoking. The results of estimating the pooled probit model of smoking participation under various specifications for the sample of males 15-19, 20-59 are presented in Tables 7 and 8, respectively.

One of the key findings is that income does not seem to affect smoking participation among youth. This seems to reject the notion that smoking participation among youth is concentrated among those with lower income status. The conclusion is unchanged when we control for province and urban dummy variables or when we control for community dummy variables.

Another key finding is that, in contrast to the income variables, parental education variables do seem to play an important role in determining the probability of current smoking. Higher parental education seems to be associated with a lower probability of current smoking, with father's education having a somewhat stronger effect. There is also a degree of nonlinearity in the effect of parental education. Having a father who has at least completed high school is associated with a stronger negative effect on smoking probabilities than having father with a lower education level. Mother's education is also negatively related with current smoking rates although the effect is much smaller than father's education.

The importance of education and the non-linearity of the effects of education on smoking participation are also found for the older samples, and seem to be robust under various specifications. This is an important finding, together with the similar results on tobacco budget shares, because it suggests that one possible pathway to reduce smoking participation in the long-run is to make improvement in education. This is especially important in Indonesia where there is an absence of well-

defined tobacco control policies of any sort. One unresolved policy question is then whether strong and continuing anti-smoking messages would help to lower smoking, at least among the better educated.

Having a senior male member in the household who smokes seems to increase the probability of smoking, and having no other senior member present in the household also increases the probability of smoking, controlling for age of the individual. (Again, note here we do not correct for the endogeneity of this choice variable).

One puzzling finding for which we have not found a good explanation is that the coefficients on log of price of cigarettes turn out to be positive when we control for province and urban interactions, although the coefficients become not statistically significant if we control for community dummy variables.

### ***Smoking intensity***

The results of our smoking intensity estimation using the tobit specifications are presented in Tables 9 and 10.<sup>15</sup> As in our smoking participation estimates, parental education has a negative effect on the quantity of cigarette smoked among all our samples. Parental education seems to affect smoking intensity non-linearly, a result similar to the findings on smoking participation. For males 15-19 years it is education of the father that seems to have the largest effect on smoking intensity. For the older males ages 20-59, own education seem to have a positive relationship with smoking intensity for those who have not completed senior high school, and a negative relationship for those who have.

What is perhaps more interesting is that per capita expenditure is statistically significant in influencing smoking intensity, particularly among males 20-59. Among males 15-19 the coefficient is only significant (at the 5 percent level) for those above the median *pce*. Among 20-59 years old, the coefficients on per capita expenditure on both those below and above median are positive and significant. Across specifications, the numbers suggest that among 20-59 years old, effects of per capita expenditure are stronger for those with income below the median. Calculated income elasticities hover between 0.10 and 0.15, depending on the specification. Thus these estimates show much lower income elasticities than the estimates from the budget share equations.

Our findings on price effects under the tobit specification are inconclusive. The coefficient is *positive* although not significant among 15-19 years old (except for the specification without year, province, and urban dummy variables). Among the 20-59 years old (Table 10), the coefficients on price of cigarettes are negative but became not statistically significant when we introduce province an urban dummy and their interactions.

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<sup>15</sup> The estimates reported are average partial effects, not the latent variable coefficients.

Intensity of smoking seems to increase when there is a senior male member who is also smoking, and having no other senior member present in the household also seems to increase the number of cigarettes smoked per day.

As in the tobit specifications, the effects of parental education on smoking intensity of 15-19 years old are negative and jointly significant, although now the effect of having father who has completed senior high school becomes not significant.

The OLS results on the effects of price, shown in Table 11 and 12, are somewhat easier to interpret than the Tobit results. The estimations are conditional on individuals reporting positive number of cigarettes smoked per day, and the dependent variable is in log form. The coefficient on log of price of cigarette readily provides us with price elasticity of cigarettes. When we control for province and urban interactions, the price elasticity of cigarette among males 15-19 is around  $-0.33$ . Note that this elasticity is much lower from the ones obtained using the tobacco share expenditure estimates. The price elasticity of  $-0.33$  is in fact closer to the estimates found by Haryanto and Damayanti in a 2001 study quoted by Djutaharta and Surya (2003). Haryanto et al use time series data from 1970 to 2001 and find that the price elasticity is around  $-0.35$ .

Among 20-59 years old, after controlling for province and urban characteristics, price does not seem to have any effects on smoking intensity, consistent with our tobit estimates. The effects of income are also similar, they are positive and significant. Among this group of people, own education does not seem to be significant.

### ***Smoking Behavior of Panel Respondents***

#### **Intensity**

The results for panel respondents who were 15-19 in 1997 are shown in Table 13. The first three columns use the same specifications shown in the smoking intensity estimations for all respondents ages 15-19. The results are somewhat different between these two samples, suggesting that there are some sample composition effects. Parental education variables, jointly significant when we use all observations become not significant when we just use panel respondents. Prices are still jointly significant and the coefficients on log price of cigarettes are somewhat more negative. Estimating smoking intensity using individual fixed effects doesn't tell us much. Note that in this specification, the identification comes off only from changes in prices and *pce*.

Table 14 shows the results for panel respondents age 20-59. In the OLS specifications the effects of own education, are not jointly significant, similar to the results using all individuals age 20-59. The effects of *pce* are positive and significant, and the coefficients on log price of cigarette are negative and significant. Estimating the model using fixed effects, only *pce* variables are significant.

## Starting and Quitting

Of the 896 panel respondents age 15-19 who were not current smokers in 1997, around 55 percent (494) became smokers by 2000 (Table 15), and of the 1839 panel respondents age 20-59 who were non-smokers in 1997, only around 18 percent (337) become smokers in 2000 (Table 16). The percentage of quitters (those who were to be non-smokers in 2000, out of those who were smokers in 1997) is around 8 percent in each group (Table 17 and 18).

The multivariate analysis of starting and quitting unfortunately proved not to be too fruitful. The only interesting thing to note is that non-smokers in 1997 with lower income are less likely to become smokers by 2000.

## 7. Price Elasticities of Cigarette

Overall price elasticities of cigarette under different specifications are presented in Table 19. Each of the columns corresponds to each of the specifications in the smoking participation and intensity estimation. The first set of price elasticities were calculated from the participation elasticity (from the probit regressions) and intensity elasticity (OLS regressions, conditional on positive number of cigarettes smoked). We then also calculated price elasticities from the tobit – unconditional on whether the individual smoke a positive number of cigarettes. In addition, as a robustness check we also calculate the price elasticities out of estimations using the GLM method.<sup>16</sup> For the two part model, this is done by using GLM in the second part, conditional on positive number of cigarettes smoked. Then we also estimate the model using unconditional GLM approach. The results of the GLM estimations are presented in Appendix Table 1 through 4.

For male ages 15-19, overall price elasticities seem to be sensitive to the choice of the approach. The overall price elasticities under the two-part model with GLM in the second part seem to be less negative across all specifications, compared to those under OLS. The unconditional GLM approach and the tobit seem to be very different. Our preferred specification, where we control for province, urban, and their interactions (column 3) suggest that overall price elasticity of cigarette is between -0.034 (with GLM) and -0.115 (OLS). The overall price elasticities for male age 20-59 are even lower. For this group of people, the elasticity estimates under the alternative approaches are not much different. Price elasticity of cigarette is between -0.049 and -0.059, which is very close to zero.

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<sup>16</sup> Ross and Chaloupka (2002) suggest estimating price elasticities under alternative approaches (OLS, OLS with retransformation of the results of the OLS to obtain consistent estimates, and GLM) in order to obtain results that are comparable with existing literature and unbiased estimates of the price elasticity. See also Mullahy (1998) and Manning and Mullahy (2001).

## 8. Conclusion

Smoking participation of young men is negatively related to parental education, but there does not seem to be any significant effect of income level on the decision to smoke. However, conditional on being a smoker, per capita expenditure seem to be positively associated with a higher intensity of smoking. According to our estimates on smoking intensity, increasing the price of cigarettes might decrease the number of cigarettes smoked per day, and the effect is stronger for younger individuals. However, the estimated price elasticities of cigarettes turn out to be close to zero, suggesting that there is limited scope to influence smoking behavior through price related policy.

Another finding that we would like to emphasize is the significant percentage of individuals who start smoking at an early age. What are the medium and long run consequences of early smoking in health and labor market outcome? This is one of the very interesting issues that deserve further investigation.

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## **Appendix**

### **Prices**

Information on how much the individual spent in the last week for tobacco product, the type of the tobacco product, and the quantities were collected with the smoking module. Price of cigarette was constructed by first obtaining the unit values of filtered clove cigarettes purchased by the individual in the last month. We chose to use the price of filtered clove cigarette because this is the tobacco product consumed by around 55 percent of current smokers (26 percent smoked unfiltered clove cigarettes, and around 10 percent smoked filtered cigarettes). There might still be quality differences between different brands of filtered clove cigarettes that we are not able to control for. We then take the median of the unit values at the subdistrict level as the price of cigarettes in the subdistrict.

Prices of sugar, cooking oil, were constructed in similar ways, using information from the household expenditures module. As mentioned in the text, although there are several other products for which we have information on, but unfortunately only the expenditure on sugar and cooking oil were non-zero for most of the households in both 1997 and 2000.

### **Education**

Schooling variables were constructed from the information collected on the highest education level attended and the highest grade completed at the level. The values range from 0 (no schooling or not completed first grade) to 17 (university graduate). For own schooling variables, we use information from the individual modules when available, and from the household roster otherwise. For parental schooling, we also use information from the individual modules or the household roster when the parents and the child coreside. If the parents lived outside the households we use information from the non-coresident parents that ask questions about schooling as well as other individual characteristics.

**Table 1. Frequency of Smoking**

	15 and above						15 - 19 years					
	Men			Women			Men			Women		
	1993	1997	2000	1993	1997	2000	1993	1997	2000	1993	1997	2000
% ever smoked	77.2 (0.8)	68.9 (0.8)	70.4 (0.6)	11.9 (0.6)	6.9 (0.4)	6.0 (0.3)	32.2 (3.7)	36.7 (1.5)	43.1 (1.3)	0.7 (0.5)	0.3 (0.1)	0.4 (0.1)
% currently smoke <sup>a)</sup>	68.5 (1.0)	63.5 (0.9)	64.8 (0.7)	4.4 (0.4)	2.7 (0.2)	2.7 (0.2)	30.8 (3.8)	35.3 (1.5)	41.8 (1.3)	0.7 (0.5)	0.1 (0.1)	0.3 (0.1)
% currently smoke tobacco	10.8 (0.9)	11.3 (0.7)	9.3 (0.5)	0.8 (0.1)	0.5 (0.1)	0.3 (0.1)	5.6 (1.6)	7.6 (0.8)	10.2 (0.8)	0.4 (0.4)	0.1 (0.1)	0.0 (0.1)
% currently smoke cloves	56.6 (1.2)	51.4 (1.0)	55.4 (0.8)	3.6 (0.3)	2.2 (0.2)	2.3 (0.2)	24.3 (3.7)	27.4 (1.5)	31.6 (1.3)	0.4 (0.4)	0.0 (0.0)	0.2 (0.1)
Number of individuals	[6,555]	[9,044]	[11,941]	[7,868]	[10,706]	[13,253]	[214]	[1,581]	[1,888]	[279]	[1,703]	[2,076]
	20 - 29 years						30 - 39 years					
	Men			Women			Men			Women		
	1993	1997	2000	1993	1997	2000	1993	1997	2000	1993	1997	2000
% ever smoked	72.4 (1.6)	68.4 (1.4)	72.4 (1.0)	1.9 (0.4)	0.8 (0.2)	1.2 (0.2)	77.0 (1.2)	76.7 (1.1)	74.9 (1.1)	4.0 (0.6)	3.4 (0.5)	2.8 (0.4)
% currently smoke <sup>a)</sup>	67.4 (1.7)	66.5 (1.4)	69.8 (1.0)	1.4 (0.3)	0.5 (0.2)	0.9 (0.2)	70.2 (1.3)	73.1 (1.2)	70.6 (1.1)	2.7 (0.4)	2.5 (0.4)	2.3 (0.3)
% currently smoke tobacco	10.9 (1.3)	13.0 (0.9)	12.5 (0.8)	0.3 (0.2)	0.2 (0.1)	0.3 (0.1)	10.3 (1.1)	10.3 (0.9)	8.7 (0.7)	0.6 (0.2)	0.4 (0.2)	0.3 (0.1)
% currently smoke cloves	56.3 (1.9)	53.0 (1.5)	57.2 (1.1)	1.1 (0.3)	0.3 (0.1)	0.6 (0.1)	59.3 (1.5)	62.4 (1.4)	61.9 (1.2)	2.1 (0.4)	1.9 (0.3)	1.9 (0.3)
Number of individuals	[902]	[1,855]	[3,135]	[1,548]	[2,393]	[3,439]	[1,810]	[1,954]	[2,534]	[2,075]	[2,445]	[2,830]
	40 - 49 years						50 - 59 years					
	Men			Women			Men			Women		
	1993	1997	2000	1993	1997	2000	1993	1997	2000	1993	1997	2000
% ever smoked	76.4 (1.3)	74.7 (1.3)	76.4 (1.2)	9.2 (1.1)	4.9 (0.7)	5.2 (0.6)	83.3 (1.2)	80.8 (1.4)	78.3 (1.4)	21.7 (1.5)	15.6 (1.3)	12.0 (1.0)
% currently smoke <sup>a)</sup>	69.4 (1.5)	69.3 (1.4)	70.4 (1.3)	5.2 (0.7)	3.2 (0.5)	3.8 (0.5)	72.7 (1.7)	72.0 (1.6)	68.3 (1.6)	8.7 (1.1)	6.6 (0.8)	5.7 (0.7)
% currently smoke tobacco	10.6 (1.2)	10.6 (1.1)	6.6 (0.8)	0.8 (0.3)	0.4 (0.2)	0.4 (0.2)	12.5 (1.3)	13.2 (1.6)	7.0 (0.9)	1.2 (0.4)	1.1 (0.3)	0.5 (0.2)
% currently smoke cloves	57.9 (1.8)	57.6 (1.6)	63.8 (1.3)	4.4 (0.7)	2.8 (0.5)	3.4 (0.5)	58.7 (1.9)	57.7 (1.9)	61.3 (1.7)	7.4 (1.1)	5.5 (0.8)	5.2 (0.7)
Number of individuals	[1,367]	[1,468]	[1,875]	[1,324]	[1,665]	[2,050]	[1,105]	[1,065]	[1,178]	[1,292]	[1,292]	[1,326]
	60 and above											
	Men			Women								
	1993	1997	2000	1993	1997	2000						
% ever smoked	84.8 (1.3)	82.3 (1.3)	80.8 (1.3)	31.2 (1.8)	28.7 (2.0)	26.0 (1.8)						
% currently smoke <sup>a)</sup>	68.5 (1.7)	65.8 (1.8)	63.6 (1.7)	6.4 (0.8)	6.5 (0.9)	6.5 (0.8)						
% currently smoke tobacco	11.1 (1.3)	14.6 (1.7)	8.0 (1.1)	1.3 (0.4)	1.2 (0.4)	0.6 (0.2)						
% currently smoke cloves	55.1 (1.9)	49.6 (2.1)	55.7 (1.7)	4.9 (0.7)	5.1 (0.7)	5.9 (0.8)						
Number of individuals	[1,157]	[1,121]	[1331]	[1350]	[1208]	[1532]						

Source: IFLS1, IFLS2 and IFLS 3

a) Currently smoke cigarettes/cigars. Standar errors (in parentheses) are robust to clustering at the community level.

**Table 2. Average Number of Cigarettes Smoked per Day (for Current Smokers)**

		Average		
		1993	1997	2000
15 and above				
	Men	11.5 (0.2)	11.7 (0.2)	11.4 (0.1)
	Women	6.7 (0.4)	7.6 (0.4)	7.3 (0.4)
15- 19 years				
	Men	7.6 (0.8)	8.5 (0.3)	8.4 (0.2)
	Women	- -	- -	7.2 (2.6)
20 - 29 years				
	Men	10.8 (0.4)	11.3 (0.3)	11.1 (0.2)
	Women	7.9 (1.9)	9.4 (0.9)	7.2 (1.3)
30 - 39 years				
	Men	12.3 (0.3)	12.8 (0.2)	12.5 (0.2)
	Women	7.8 (0.9)	7.7 (0.9)	7.8 (1.0)
40 - 49 years				
	Men	12.2 (0.3)	13.0 (0.3)	12.8 (0.3)
	Women	5.4 (0.7)	8.0 (1.0)	8.0 (0.8)
50 -59 years				
	Men	11.7 (0.4)	12.1 (0.4)	12.0 (0.3)
	Women	7.1 (0.7)	7.4 (0.7)	7.1 (0.6)
60 and above				
	Men	9.6 (0.4)	10.2 (0.3)	10.1 (0.3)
	Women	6.0 (0.7)	7.1 (0.9)	6.7 (0.6)

Source: IFLS1, IFLS2, and IFLS3

Standard errors (in parentheses) are robust to clustering at the community level. Dash (-) indicates that estimates are not reported due to small cell size.

**Table 3. Age When Start Smoking, by Birth Cohort**

Birth Cohort /Gender	% Age Start Smoking				Average Age to Start	Numbers of Individuals
	<=15	<=18	<=21	<=24		
<b>1981-1985</b>						
Men	22.5 (1.23)	...	...	...	14.4 (0.10)	1,550
Women	0.20 (0.12)	...	...	...	13.8 (0.66)	1,689
<b>1971-1980</b>						
Men	20.4 (0.82)	44.0 (1.09)	...	...	16.7 (0.09)	3,842
Women	0.1 (0.04)	0.3 (0.09)	...	...	19.2 (0.55)	4,305
<b>1961-1970</b>						
Men	18.2 (0.78)	38.1 (0.98)	57.9 (1.02)	64.1 (0.98)	18.9 (0.14)	3,174
Women	0.5 (0.13)	1.0 (0.18)	1.4 (0.22)	1.6 (0.25)	21.2 (0.69)	3,320
<b>1951-1960</b>						
Men	16.3 (0.90)	31.4 (1.18)	49.7 (1.28)	56.0 (1.25)	21.1 (0.26)	2,227
Women	0.8 (0.22)	1.3 (0.26)	2.5 (0.39)	2.8 (0.43)	25.4 (0.73)	2,317
<b>1941-1950</b>						
Men	15.8 (1.09)	27.2 (1.27)	45.6 (1.46)	49.9 (1.49)	22.2 (0.32)	1,418
Women	2.0 (0.36)	2.8 (0.46)	5.2 (0.76)	5.7 (0.80)	28.1 (0.96)	1,557
<b>Before 1941</b>						
Men	20.1 (1.03)	30.1 (1.12)	48.0 (1.22)	51.9 (1.24)	22.4 (0.28)	1,986
Women	4.5 (0.54)	6.7 (0.69)	11.3 (0.98)	11.8 (1.02)	28.5 (0.74)	2,343

Source: IFLS1, IFLS2, and IFLS3.

Standard errors (in parentheses) are robust to clustering at the community level.

**Table 4a. Monthly expenditure share of food, rice, and tobacco from IFLS 1993, 1997 and 2000**

	1993*	1997	2000
% of household monthly expenditure			
Food	-	57.2	60.01
Rice	-	13.15	11.21
Tobacco	-	4.60	6.13
% of household monthly food, alcohol, and tobacco expenditure			
Rice	21.86	21.78	17.86
Tobacco	7.28	7.87	9.85

\* The questions on household non-food expenditure in IFLS1 1993 were asked differently, and thus not comparable to that in IFLS2 or IFLS3.

**Table 4b. Monthly expenditure share of food, rice, and tobacco from Susenas 1993, 1996 and 1999**

	1993	1996	1999
% of household monthly expenditure			
Food	63.12	62.25	62.24
Rice	17.08	16.48	18.07
Tobacco	5.28	4.73	4.75
% of household monthly food, alcohol, and tobacco expenditure			
Rice	26.28	25.9	28.3
Tobacco	8.10	7.26	7.47

\* The observations include only households in the 13 IFLS provinces.

**Table 5. Tobacco expenditure share of household expenditure, IFLS2 and IFLS3 pooled**

	Dependent variable: share of tobacco expenditure		
	(1)	(2)	(3)
<b>Household composition</b>			
Number of females 15-24	-0.257 (3.239)***	-0.253 (3.194)***	-0.279 (3.537)***
Number of males 15-24	0.500 (5.710)***	0.498 (5.686)***	0.436 (5.050)***
Number of females 25-59	-0.924 (9.505)***	-0.920 (9.465)***	-0.931 (9.660)***
Number of males 25-59	1.646 (14.983)***	1.646 (15.002)***	1.641 (15.030)***
Number of females 60+	-0.990 (8.264)***	-0.986 (8.236)***	-0.932 (7.847)***
Number of males 60+	0.116 (0.787)	0.115 (0.778)	0.217 (1.489)
Max. education (adult female, years)	-0.086 (5.935)***	-0.084 (5.762)***	-0.090 (6.068)***
Max. education (adult male, years)	-0.087 (5.821)***	-0.084 (5.649)***	-0.078 (5.239)***
Log price - cigarette (Rp)	-0.257 (1.381)	0.004 (0.018)	0.498 (2.265)**
Log price - cooking oil (Rp)	-0.481 (1.711)*	-0.532 (1.882)*	-0.552 (1.844)*
Log price - sugar (Rp)	2.565 (8.171)***	3.290 (7.401)***	1.530 (2.887)***
Log pce (spline): 0-Rp 150,000	1.829 (8.074)***	1.816 (8.012)***	1.779 (7.854)***
Log pce (spline): >Rp 150,000	-1.103 (12.260)***	-1.097 (12.172)***	-1.080 (11.955)***
Year dummy (2000 =1)		-0.848 (2.426)**	-0.049 (0.110)
Constant	-33.021 (10.672)***	-39.132 (9.712)***	-25.549 (5.012)***
Expenditure elasticities with respect to pce <sup>a</sup>			
HH with pce 0 - Rp 150,000	1.332	1.330	1.325
HH with pce > Rp 150,000	0.783	0.785	0.788
Own-price elasticity of cigarettes <sup>a</sup>			
All households	-1.049	-0.999	-0.905
Province X urban dummy variables			
	No	No	Yes
p-value (hh composition)	0.000	0.000	0.000
p-value (education)	0.000	0.000	0.000
p-value (log of pce splines)	0.000	0.000	0.000
p-value (log prices)	-	0.000	0.000
Observations	17411	17411	17411
Number of households in 1997	7424	7424	7424
Number of households in 2000	9987	9987	9987
R-squared	0.092	0.092	0.108

<sup>a</sup>The elasticities are calculated using predicted share of tobacco expenditure, see text.

Dummy variable for no adult male or missing education of adult male in the household (around 5 percent of the sample) is included in the regressions but not reported in the table. Coefficients on log pce splines measure the slopes of the intervals. Standard errors are corrected for clustering at the household level and heteroskedasticity. Robust t statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 6. Descriptive Statistics**

Variable	15-19 IFLS2 and IFSL3 (N=3,033)		20-59 IFLS2 and IFSL3 (N=16,144)	
	Mean	Std .dev	Mean	Std .dev
Age	16.96	1.13	36.57	10.89
Year 2000=1	0.53	0.5	0.57	0.50
Currently smoke cigarette	0.35	0.48	0.70	0.46
<u>Mother's education</u>				
Year	4.66	3.95		
No schooling=1	0.2	0.43		
Some primary school=1	0.29	0.45		
Completed primary school=1	0.28	0.45		
Completed junior high school=1	0.09	0.29		
Completed senior high school=1	0.09	0.29		
Missing or not in hh=1	0.04	0.2		
<u>Father's education</u>				
Year	5.74	4.47		
No schooling=1	0.12	0.41		
Some primary school=1	0.24	0.43		
Completed primary school=1	0.28	0.45		
Completed junior high school=1	0.11	0.31		
Completed senior high school=1	0.18	0.38		
Missing or not in hh=1	0.07	0.26		
<u>Own education</u>				
Year			7.75	4.56
Some primary school=1			0.19	0.39
Completed primary school=1			0.27	0.44
Completed junior high school=1			0.14	0.35
Completed senior high school=1			0.32	0.47
Spline pce < Rp 150,000	11.80	0.25	11.81	0.25
Spline pce >= Rp 150,000	0.50	0.60	0.54	0.62
Price of cigarette/stick (Rp)	207	105	185	102
Price of sugar/kg (Rp)	3,204	1,180	3,049	1172
Price of cooking oil/litre (Rp)	3,684	1,057	3,568	1078
Urban =1	0.52	0.5	0.53	0.5
Any older male in hh smoke=1	0.76	0.43	0.72	0.45
No older male in hh=1	0.1	0.3	0.15	0.35
<u>Language</u>				
Bahasa Indonesia	0.47	0.50	0.46	0.50
Javanese	0.33	0.47	0.35	0.48
Sumatranese	0.10	0.30	0.09	0.29
Outer Island	0.10	0.30	0.10	0.30
<u>Religion</u>				
Islam	0.88	0.32	0.89	0.32
Christian	0.07	0.25	0.06	0.24
Hindu	0.04	0.20	0.05	0.21
Buddha	0.01	0.09	0.01	0.08

Source: IFLS2 and IFLS3



**Table 7. Smoking participation, 15-19, IFLS2 and IFLS3 Pooled Probit**

	Dep var: currently smoking =1				
	(1)	(2)	(3)	(4)	(5)
Age	0.775 [4.842]***	0.773 [4.832]***	0.801 [4.986]***	0.813 [5.075]***	0.831 [5.129]***
Age squared	-0.019 [4.133]***	-0.019 [4.122]***	-0.020 [4.271]***	-0.020 [4.354]***	-0.020 [4.419]***
<u>Mother's education</u>					
<i>Some primary school (=1)</i>	0.006 [0.255]	0.007 [0.264]	-0.002 [0.059]	-0.002 [0.071]	0.003 [0.104]
<i>Compl. primary school (=1)</i>	-0.072 [2.680]***	-0.071 [2.669]***	-0.081 [2.941]***	-0.078 [2.846]***	-0.074 [2.676]***
<i>Compl. junior high (=1)</i>	-0.075 [1.973]**	-0.073 [1.925]*	-0.078 [2.039]**	-0.071 [1.835]*	-0.070 [1.798]*
<i>Compl. senior high (=1)</i>	-0.104 [2.482]**	-0.103 [2.448]**	-0.114 [2.686]***	-0.107 [2.496]**	-0.096 [2.222]**
<u>Father's education</u>					
<i>Some primary school (=1)</i>	-0.032 [1.038]	-0.031 [1.033]	-0.038 [1.225]	-0.039 [1.248]	-0.042 [1.368]
<i>Compl. primary school (=1)</i>	-0.088 [2.945]***	-0.088 [2.937]***	-0.092 [3.024]***	-0.089 [2.922]***	-0.092 [3.006]***
<i>Compl. junior high (=1)</i>	-0.106 [2.903]***	-0.105 [2.868]***	-0.102 [2.718]***	-0.096 [2.515]**	-0.097 [2.569]**
<i>Compl. senior high (=1)</i>	-0.140 [3.830]***	-0.139 [3.788]***	-0.134 [3.559]***	-0.135 [3.558]***	-0.130 [3.454]***
Log price - cigarette (Rp)	0.080 [2.447]**	0.096 [2.502]**	0.045 [1.094]	0.049 [1.179]	0.037 [0.911]
Log price - sugar (Rp)	0.016 [0.303]	0.058 [0.763]	0.046 [0.466]	0.034 [0.345]	0.028 [0.279]
Log price - cooking oil (Rp)	-0.084 [1.661]*	-0.088 [1.733]*	-0.087 [1.602]	-0.079 [1.451]	-0.077 [1.399]
Log pce (spline): 0-Rp 150,000	0.035 [0.944]	0.033 [0.913]	0.024 [0.655]	0.024 [0.657]	0.024 [0.643]
Log pce (spline): >Rp 150,000	0.012 [0.696]	0.012 [0.714]	0.012 [0.738]	0.017 [1.011]	0.022 [1.300]
Year dummy (2000=1)		-0.049 [0.791]	0.014 [0.165]	0.016 [0.187]	0.035 [0.422]
Urban			0.091 [0.878]	-0.086 [0.881]	0.111 [1.093]
<u>Language</u>					
Javanese				0.012 [0.429]	0.013 [0.453]
Sumatranese				0.100 [2.151]**	0.097 [2.086]**
Outer Island				0.033 [0.716]	0.036 [0.765]
<u>Religion</u>					
Christian				-0.123 [3.354]***	-0.116 [3.173]***
Hindu				0.045 [0.489]	0.047 [0.509]
Buddha				-0.279 [2.795]***	-0.257 [2.527]**

(continued)

*(continued)*

Any older male smoke=1					0.174 [6.554]***
No older male=1					0.207 [5.393]***
Province, urban interaction	No	No	Yes	Yes	Yes
<u>Joint significance (p-values):</u>					
Age variables	0.0000	0.0000	0.0000	0.0000	0.0000
Education variables	0.0000	0.0000	0.0000	0.0000	0.0000
Pce	0.3597	0.3669	0.3037	0.3503	0.2292
Prices	0.0004	0.0366	0.4885	0.3421	0.4494
Language	-	-	-	0.1635	0.1775
Religion	-	-	-	0.0003	0.0011
Province, urban interaction	-	-	0.0005	0.0416	0.0581
Observations	3696	3696	3696	3696	3696
Pseudo R-squared	0.0988	0.0989	0.1104	0.1159	0.125

The table shows the marginal effects of a change in explanatory variables. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Standard errors are corrected for clustering at the individual level and heteroskedasticity. Absolute value of z statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 8. Smoking participation, 20-59, IFLS2 and IFLS3 Pooled, Probit**

	Dep var: currently smoking =1				
	(1)	(2)	(3)	(4)	(5)
<u>Age (spline):</u>					
20-24	0.008 [1.752]*	0.008 [1.756]*	0.008 [1.849]*	0.009 [1.918]*	0.014 [2.923]***
25-29	0.006 [1.576]	0.006 [1.537]	0.006 [1.666]*	0.006 [1.577]	0.013 [3.421]***
30-39	-0.004 [2.150]**	-0.004 [2.093]**	-0.003 [1.920]*	-0.003 [1.868]*	-0.002 [0.994]
40-49	-0.002 [1.119]	-0.002 [1.044]	-0.002 [1.007]	-0.002 [0.887]	-0.002 [1.032]
50-59	-0.001 [0.348]	-0.001 [0.426]	-0.002 [0.709]	-0.002 [0.746]	-0.001 [0.291]
<u>Own education</u>					
<i>Some primary school (=1)</i>	0.038 [2.197]**	0.038 [2.179]**	0.032 [1.831]*	0.034 [1.922]*	0.033 [1.922]*
<i>Compl. primary school (=1)</i>	0.008 [0.476]	0.010 [0.584]	0.005 [0.285]	0.007 [0.385]	0.009 [0.526]
<i>Compl. junior high (=1)</i>	-0.056 [2.827]***	-0.050 [2.526]**	-0.052 [2.578]***	-0.046 [2.294]**	-0.040 [2.037]**
<i>Compl. senior high (=1)</i>	-0.164 [8.886]***	-0.154 [8.317]***	-0.144 [7.566]***	-0.140 [7.325]***	-0.119 [6.381]***
Log pce (spline): 0-Rp 150,000	0.018 [0.998]	0.015 [0.865]	0.014 [0.787]	0.016 [0.888]	0.019 [1.075]
Log pce (spline): >Rp 150,000	-0.002 [0.274]	0.000 [0.015]	-0.004 [0.490]	0.001 [0.075]	0.009 [1.190]
Log price - cigarette (Rp)	-0.021 [1.343]	0.046 [2.530]**	0.012 [0.635]	0.013 [0.707]	0.015 [0.786]
Log price - cooking oil (Rp)	0.006 [0.252]	0.179 [5.018]***	-0.023 [0.532]	-0.030 [0.687]	-0.025 [0.580]
Log price - sugar (Rp)	0.083 [3.728]***	0.063 [2.836]***	-0.017 [0.752]	-0.007 [0.302]	0.014 [0.608]
Year dummy (2000=1)		-0.196 [7.037]***	0.019 [0.519]	0.018 [0.492]	0.006 [0.171]
Urban			0.020 [0.362]	0.021 [0.382]	0.021 [0.381]
<u>Language</u>					
Javanese				0.034 [2.756]***	0.024 [1.962]**
Sumatranese				-0.005 [0.214]	-0.000 [0.014]
Outer Island				0.048 [2.333]**	0.042 [2.084]**
<u>Religion</u>					
Christian				-0.040 [1.944]*	-0.031 [1.610]
Hindu				-0.106 [2.661]***	-0.076 [2.014]**
Buddha				-0.285 [5.136]***	-0.262 [4.745]***

*(continued)*

Any older male smoke=1				0.401	
				[37.416]***	
No older male=1				0.279	
				[23.441]***	
Province, urban interaction	No	No	Yes	Yes	Yes
<u>Joint significance (p-values):</u>					
Age variables	0.0002	0.0003	0.0002	0.0003	0.0000
Education variables	0.0000	0.0000	0.0000	0.0000	0.0000
Pce	0.6072	0.6573	0.7088	0.6318	0.1553
Prices	0.0000	0.0000	0.7358	0.7906	0.7404
Language				0.0050	0.0464
Religion				0.0000	0.0000
Province, urban interaction			0.0000	<b>0.0000</b>	0.0000
Observations	16144	16144	16144	16144	16144
Pseudo R-squared	0.0269	0.0299	0.0451	0.0484	0.1299

The table shows the marginal effects of a change in explanatory variables. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Standard errors are corrected for clustering at the individual level and heteroskedasticity. Absolute value of z statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 9. Smoking Intensity, Male 15-19, IFLS2 and IFLS3 Pooled, Tobit**

	Dep. var: cigarette smoked (cig>=0)				
	(1)	(2)	(3)	(4)	(5)
Age	7.044	7.064	7.238	7.282	7.327
	[4.553]***	[4.569]***	[4.682]***	[4.732]***	[4.790]***
Age squared	-0.170	-0.171	-0.176	-0.177	-0.179
	[3.874]***	[3.891]***	[4.004]***	[4.054]***	[4.120]***
<u>Mother's education</u>					
<i>Some primary school (=1)</i>	-0.097	-0.103	-0.180	-0.179	-0.139
	[0.428]	[0.454]	[0.785]	[0.781]	[0.609]
<i>Compl. primary school (=1)</i>	-0.572	-0.576	-0.635	-0.609	-0.575
	[2.377]**	[2.400]**	[2.587]***	[2.488]**	[2.361]**
<i>Compl. junior high (=1)</i>	-0.918	-0.944	-0.971	-0.926	-0.921
	[2.924]***	[3.012]***	[3.058]***	[2.911]***	[2.917]***
<i>Compl. senior high (=1)</i>	-0.974	-0.992	-1.023	-0.972	-0.907
	[2.793]***	[2.852]***	[2.893]***	[2.739]***	[2.550]**
<u>Father's education</u>					
<i>Some primary school (=1)</i>	-0.582	-0.584	-0.601	-0.591	-0.601
	[2.261]**	[2.271]**	[2.324]**	[2.284]**	[2.340]**
<i>Compl. primary school (=1)</i>	-0.858	-0.861	-0.869	-0.840	-0.846
	[3.308]***	[3.323]***	[3.328]***	[3.215]***	[3.260]***
<i>Compl. junior high (=1)</i>	-1.182	-1.198	-1.149	-1.098	-1.101
	[3.982]***	[4.043]***	[3.781]***	[3.595]***	[3.633]***
<i>Compl. senior high (=1)</i>	-1.245	-1.264	-1.218	-1.223	-1.174
	[4.044]***	[4.112]***	[3.899]***	[3.922]***	[3.778]***
Log pce (spline): 0-Rp 150,000	0.505	0.527	0.485	0.477	0.474
	[1.488]	[1.551]	[1.418]	[1.402]	[1.406]
Log pce (spline): >Rp 150,000	0.316	0.311	0.317	0.357	0.374
	[2.128]**	[2.093]**	[2.125]**	[2.398]**	[2.509]**
Log price - cigarette (Rp)	0.659	0.396	0.142	0.166	0.084
	[2.095]**	[1.096]	[0.368]	[0.431]	[0.219]
Log price - sugar (Rp)	0.195	-0.523	-1.008	-1.125	-1.233
	[0.379]	[0.737]	[1.050]	[1.176]	[1.301]
Log price - cooking oil (Rp)	-0.414	-0.347	-0.275	-0.249	-0.227
	[0.883]	[0.737]	[0.547]	[0.495]	[0.455]
Year dummy (2000=1)		0.819	1.402	1.448	1.594
		[1.468]	[1.752]*	[1.816]*	[2.016]**
Urban			0.080	-0.435	-0.350
			[0.089]	[0.510]	[0.413]
<u>Language</u>					
Javanese				-0.019	-0.006
				[0.076]	[0.022]
Sumatranese				0.762	0.747
				[1.709]*	[1.690]*
Outer Island				0.286	0.320
				[0.657]	[0.737]
<u>Religion</u>					
Christian				-0.819	-0.756
				[2.437]**	[2.243]**
Hindu				0.856	0.854
				[1.071]	[1.064]
Buddha				-2.222	-2.117
				[3.192]***	[2.879]***

(continued)

Any older male smoke=1					1.169 [5.054]***
No older male=1					1.908 [4.986]***
Constant	-78.583 [5.490]***	-72.845 [4.916]***	-68.988 [4.361]***	-69.431 [4.407]***	-69.811 [4.461]***
Province, urban interaction	No	No	Yes	Yes	Yes
<u>Joint significance (p-values):</u>					
Age variables	0.0000	0.0000	0.0000	0.0000	0.0000
Education variables	0.0000	0.0000	0.0000	0.0000	0.0000
Pce (spline)	0.0069	0.0065	0.009	0.0042	0.0030
Prices	0.0003	0.4611	0.6311	0.5725	0.5377
Language	-	-	-	0.3567	0.3532
Religion	-	-	-	0.0007	0.0025
Province, urban interaction	-	-	0.4792	0.6490	0.6640
Observations	3696	3696	3696	3696	3696

The table shows the marginal effects of a change in explanatory variables. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Dummy variables indicating missing parental education are included in the regressions but not reported. Absolute value of z statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 10. Smoking Intensity, Male 20-59, IFLS2 and IFLS3 Pooled, Tobit**

	Dep. var: cigarette smoked (cig>=0)				
	(1)	(2)	(3)	(4)	(5)
<u>Age (spline):</u>					
20-24	0.253	0.252	0.255	0.258	0.321
	[2.997]***	[2.994]***	[3.050]***	[3.082]***	[3.898]***
25-29	0.242	0.242	0.245	0.240	0.303
	[3.869]***	[3.861]***	[3.935]***	[3.865]***	[4.936]***
30-39	0.039	0.040	0.039	0.041	0.062
	[1.368]	[1.385]	[1.377]	[1.444]	[2.220]**
40-49	-0.037	-0.037	-0.039	-0.036	-0.038
	[1.214]	[1.204]	[1.266]	[1.177]	[1.265]
50-59	0.029	0.028	0.027	0.025	0.049
	[0.653]	[0.638]	[0.613]	[0.581]	[1.146]
<u>Own education</u>					
<i>Some primary school (=1)</i>	1.559	1.556	1.420	1.437	1.378
	[5.494]***	[5.484]***	[5.010]***	[5.061]***	[4.947]***
<i>Compl. primary school (=1)</i>	1.074	1.080	0.965	0.985	0.987
	[3.945]***	[3.969]***	[3.534]***	[3.602]***	[3.673]***
<i>Compl. junior high (=1)</i>	0.973	0.993	0.749	0.811	0.919
	[3.188]***	[3.249]***	[2.436]**	[2.628]***	[3.026]***
<i>Compl. senior high (=1)</i>	-0.789	-0.757	-0.811	-0.771	-0.403
	[2.859]***	[2.732]***	[2.860]***	[2.705]***	[1.431]
Log pce (spline): 0-Rp 150,000	1.391	1.381	1.233	1.248	1.239
	[4.742]***	[4.708]***	[4.214]***	[4.264]***	[4.312]***
Log pce (spline): >Rp 150,000	1.061	1.068	1.015	1.060	1.152
	[8.582]***	[8.628]***	[8.203]***	[8.525]***	[9.415]***
Log price - cigarette (Rp)	-1.000	-0.780	-0.256	-0.257	-0.241
	[3.737]***	[2.510]**	[0.770]	[0.772]	[0.738]
Log price - cooking oil (Rp)	1.859	2.428	-0.774	-0.806	-0.699
	[4.178]***	[4.011]***	[0.984]	[1.024]	[0.904]
Log price - sugar (Rp)	0.659	0.600	-0.257	-0.156	0.102
	[1.636]	[1.482]	[0.587]	[0.355]	[0.237]
Year dummy (2000=1)		-0.670	1.567	1.547	1.519
		[1.386]	[2.372]**	[2.341]**	[2.322]**
Urban			1.594	1.602	1.607
			[1.994]**	[2.005]**	[2.049]**
<u>Language</u>					
Javanese				0.189	0.047
				[0.893]	[0.225]
Sumatranese				0.366	0.394
				[1.012]	[1.109]
Outer Island				0.403	0.310
				[1.076]	[0.842]
<u>Religion</u>					
Christian				-0.573	-0.439
				[1.892]*	[1.467]
Hindu				-1.183	-0.787
				[2.002]**	[1.334]
Buddha				-2.996	-2.545
				[3.998]***	[3.386]***

					<i>(continued)</i>
Any older male smoke=1					6.864 [30.406]***
No older male=1					5.023 [20.427]***
Constant	-35.597 [7.804]***	-40.344 [7.073]***	-6.842 [0.909]	-8.068 [1.069]	-18.506 [2.488]**
Province, urban interaction	No	No	Yes	Yes	Yes
<u>Joint significance (p-values):</u>					
Age variables	0.0000	0.0000	0.0000	0.0000	0.0000
Education variables	0.0000	0.0000	0.0000	0.0000	0.0000
Pce (spline)	0.0000	0.0000	0.0000	0.0000	0.0000
Prices	0.0000	0.0000	0.5027	0.5518	0.7007
Language				0.4324	0.5931
Religion				0.0001	0.0020
Province, urban interaction			0.0000	0.0000	0.0000
Observations	16144	16144	16144	16144	16144

The table shows the marginal effects of a change in explanatory variables. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Absolute value of z statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.



**Table 11. Smoking Intensity, Male 15-19, IFLS2 and IFLS3 Pooled, OLS (log-linear)**

	Dep. var: log (cigarette smoked)				
	(1)	(2)	(3)	(4)	(5)
Age	0.541	0.538	0.414	0.391	0.392
	[1.216]	[1.213]	[0.911]	[0.856]	[0.857]
Age squared	-0.012	-0.012	-0.008	-0.008	-0.008
	[0.926]	[0.926]	[0.649]	[0.595]	[0.597]
<u>Mother's education</u>					
<i>Some primary school (=1)</i>	-0.066	-0.070	-0.071	-0.072	-0.070
	[1.092]	[1.169]	[1.164]	[1.163]	[1.139]
<i>Compl. primary school (=1)</i>	-0.101	-0.104	-0.069	-0.069	-0.068
	[1.482]	[1.523]	[0.998]	[1.002]	[0.986]
<i>Compl. junior high (=1)</i>	-0.217	-0.237	-0.208	-0.207	-0.209
	[2.261]**	[2.488]**	[2.077]**	[2.062]**	[2.083]**
<i>Compl. senior high (=1)</i>	-0.038	-0.051	-0.018	-0.028	-0.029
	[0.350]	[0.468]	[0.170]	[0.256]	[0.262]
<u>Father's education</u>					
<i>Some primary school (=1)</i>	-0.201	-0.202	-0.171	-0.185	-0.184
	[2.849]***	[2.867]***	[2.361]**	[2.542]**	[2.530]**
<i>Compl. primary school (=1)</i>	-0.178	-0.178	-0.160	-0.172	-0.171
	[2.433]**	[2.442]**	[2.145]**	[2.300]**	[2.287]**
<i>Compl. junior high (=1)</i>	-0.331	-0.345	-0.278	-0.293	-0.291
	[3.762]***	[3.915]***	[3.035]***	[3.185]***	[3.158]***
<i>Compl. senior high (=1)</i>	-0.153	-0.169	-0.119	-0.127	-0.124
	[1.588]	[1.756]*	[1.203]	[1.287]	[1.250]
Log pce (spline): 0-Rp 150,000	0.124	0.139	0.153	0.148	0.149
	[1.317]	[1.480]	[1.589]	[1.553]	[1.557]
Log pce (spline): >Rp 150,000	0.003	0.000	0.002	-0.003	-0.001
	[0.072]	[0.003]	[0.041]	[0.056]	[0.028]
Log price - cigarette (Rp)	-0.355	-0.478	-0.327	-0.333	-0.334
	[4.287]***	[5.182]***	[3.232]***	[3.289]***	[3.303]***
Log price - sugar (Rp)	0.359	-0.009	-0.123	-0.110	-0.115
	[2.548]**	[0.046]	[0.455]	[0.410]	[0.429]
Log price - cooking oil (Rp)	0.178	0.217	0.261	0.249	0.248
	[1.417]	[1.704]*	[1.944]*	[1.859]*	[1.857]*
Year dummy (2000=1)		0.404	0.297	0.303	0.311
		[2.679]***	[1.326]	[1.353]	[1.388]
Urban			0.690	0.686	0.689
			[3.196]***	[3.126]***	[3.141]***
<u>Language</u>					
Javanese				-0.028	-0.029
				[0.399]	[0.405]
Sumatranese				0.015	0.017
				[0.120]	[0.134]
Outer Island				-0.247	-0.242
				[2.192]**	[2.136]**
<u>Religion</u>					
Christian				0.086	0.088
				[0.632]	[0.643]
Hindu				0.109	0.103
				[0.527]	[0.501]
Buddha				-0.072	-0.080
				[0.109]	[0.121]

(continued)

Any older male smoke=1					0.048
					[0.582]
No older male=1					0.054
					[0.585]
Constant	-7.844	-4.914	-3.818	-3.919	-3.926
	[1.914]*	[1.167]	[0.861]	[0.884]	[0.885]
Province, urban interaction	No	No	Yes	Yes	Yes
<u>Joint significance (p-values):</u>					
Age variables	0.0000	0.0000	0.0000	0.0000	0.0000
Education variables	0.0000	0.0000	0.0063	0.0039	0.0045
Pce (spline)	0.3600	0.2899	0.2639	0.2955	0.2916
Prices	0.0002	0.0000	0.0086	0.0082	0.0081
Language	-	-	-	0.1686	0.1843
Religion	-	-	-	0.9149	0.9164
Province, urban interaction	-	-	0.0000	0.0000	0.0000
Observations	1390	1390	1390	1390	1390
R-squared	0.085	0.089	0.125	0.128	0.129

The table shows the marginal effects of a change in explanatory variables. Omitted category for schooling is no schooling, for language Bahasa Indonesia, and for religion Moslem. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Standard errors are corrected for clustering at the individual level and heteroskedasticity. Absolute value of z statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 12. Smoking Intensity, Male 20-59, IFLS2 and IFLS3 Pooled, OLS (log-linear)**

	Dep. var: log (cigarette smoked)				
	(1)	(2)	(3)	(4)	(5)
<u>Age (spline):</u>					
20-24	0.035	0.035	0.034	0.034	0.036
	[3.969]***	[3.996]***	[3.949]***	[3.927]***	[4.140]***
25-29	0.015	0.015	0.015	0.015	0.015
	[2.282]**	[2.303]**	[2.320]**	[2.348]**	[2.365]**
30-39	0.010	0.010	0.009	0.008	0.009
	[3.251]***	[3.207]***	[2.888]***	[2.839]***	[2.967]***
40-49	-0.006	-0.006	-0.005	-0.005	-0.006
	[1.717]*	[1.721]*	[1.628]	[1.686]*	[1.776]*
50-59	-0.009	-0.009	-0.007	-0.007	-0.006
	[2.000]**	[1.973]**	[1.660]*	[1.584]	[1.342]
<u>Own education</u>					
<i>Some primary school (=1)</i>	0.037	0.038	0.024	0.023	0.020
	[1.292]	[1.319]	[0.878]	[0.811]	[0.738]
<i>Compl. primary school (=1)</i>	0.024	0.022	0.007	0.006	0.005
	[0.840]	[0.768]	[0.258]	[0.209]	[0.177]
<i>Compl. junior high (=1)</i>	0.098	0.093	0.047	0.043	0.045
	[3.042]***	[2.891]***	[1.512]	[1.384]	[1.422]
<i>Compl. senior high (=1)</i>	0.049	0.040	0.002	-0.003	0.004
	[1.585]	[1.303]	[0.063]	[0.098]	[0.143]
Log pce (spline): 0-Rp 150,000	0.224	0.227	0.190	0.190	0.186
	[7.217]***	[7.323]***	[6.291]***	[6.288]***	[6.190]***
Log pce (spline): >Rp 150,000	0.112	0.111	0.104	0.101	0.103
	[8.294]***	[8.202]***	[7.795]***	[7.574]***	[7.726]***
Log price - cigarette (Rp)	-0.149	-0.202	-0.029	-0.032	-0.033
	[5.222]***	[6.114]***	[0.848]	[0.942]	[0.967]
Log price - cooking oil (Rp)	0.266	0.127	0.112	0.120	0.121
	[5.717]***	[1.982]**	[1.439]	[1.538]	[1.553]
Log price - sugar (Rp)	-0.139	-0.127	-0.039	-0.048	-0.042
	[3.172]***	[2.897]***	[0.861]	[1.048]	[0.920]
Year dummy (2000=1)		0.164	-0.045	-0.043	-0.038
		[3.222]***	[0.696]	[0.656]	[0.587]
Urban			0.171	0.142	0.142
			[2.071]**	[1.644]	[1.628]
<u>Language</u>					
Javanese				-0.051	-0.053
				[2.340]**	[2.440]**
Sumatranese				0.069	0.068
				[2.044]**	[2.018]**
Outer Island				-0.039	-0.039
				[1.049]	[1.038]
<u>Religion</u>					
Christian				0.029	0.032
				[0.892]	[1.001]
Protestant				-0.058	-0.050
				[0.900]	[0.773]
Hindu				0.098	0.110
				[0.896]	[0.996]

*(continued)*

Any older male smoke=1					0.214
					[6.936]***
No older male=1					0.185
					[5.990]***
Constant	-1.637	-0.471	-1.071	-1.107	-1.362
	[3.457]***	[0.782]	[1.441]	[1.485]	[1.823]*
Province, urban interaction	No	No	Yes	Yes	Yes
<u>Joint significance (p-values):</u>					
Age variables	0.0000	0.0000	0.0000	0.0000	0.0000
Education variables	0.0016	0.0183	0.2744	<b>0.2939</b>	0.3712
pce (spline)	0.0000	0.0000	0.0000	0.0000	0.0000
Prices	0.0000	0.0000	0.3849	0.2915	0.3048
Language	-	-	-	0.0117	0.0100
Religion	-	-	-	0.4914	0.4633
Province, urban interaction	-	-	0.0000	0.0000	0.0000
Observations	11039	11039	11039	11039	11039
R-squared	0.041	0.042	0.097	0.099	0.104

The table shows the marginal effects of a change in explanatory variables. Omitted category for schooling is no schooling, for language Bahasa Indonesia, and for religion Moslem. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Standard errors are corrected for clustering at the individual level and heteroskedasticity. Absolute value of z statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 13. Smoking Intensity, IFLS2 and IFLS3 Panel Individuals , Male 15-19, OLS and Individual Fixed Effects**

	Dep var: Cigarettes smoked (log)			
	OLS			FE
	(1)	(2)	(3)	
Age	0.013 [0.018]	-0.004 [0.005]	0.058 [0.084]	
Age squared	0.004 [0.182]	0.004 [0.195]	0.002 [0.098]	
<u>Mother's education</u>				
<i>Some primary school (=1)</i>	-0.138 [1.540]	-0.147 [1.660]*	-0.103 [1.116]	
<i>Compl. primary school (=1)</i>	-0.093 [0.919]	-0.1 [0.990]	-0.042 [0.388]	
<i>Compl. junior high (=1)</i>	-0.186 [1.294]	-0.205 [1.438]	-0.131 [0.896]	
<i>Compl. senior high (=1)</i>	-0.012 [0.062]	-0.019 [0.101]	0.021 [0.122]	
<u>Father's education</u>				
<i>Some primary school (=1)</i>	0.035 [0.325]	0.036 [0.337]	0.041 [0.375]	
<i>Compl. primary school (=1)</i>	-0.075 [0.663]	-0.076 [0.675]	-0.086 [0.780]	
<i>Compl. junior high (=1)</i>	-0.273 [2.075]**	-0.288 [2.176]**	-0.307 [2.061]**	
<i>Compl. senior high (=1)</i>	0.002 [0.016]	-0.015 [0.102]	-0.011 [0.077]	
Log pce (spline): 0-Rp 150,000	0.154 [1.025]	0.179 [1.205]	0.224 [1.575]	0.283 [0.961]
Log pce (spline): >Rp 150,000	-0.021 [0.293]	-0.028 [0.388]	-0.004 [0.063]	0.235 [1.490]
Log price - cigarette (Rp)	-0.359 [3.268]***	-0.458 [3.711]***	-0.386 [2.565]**	0.542 [1.500]
Log price - cooking oil (Rp)	0.09 [0.490]	0.132 [0.715]	0.102 [0.458]	-0.722 [1.699]*
Log price - sugar (Rp)	0.51 [2.431]**	0.146 [0.500]	-0.234 [0.553]	0.489 [1.037]
Year dummy (2000=1)		0.402 [1.805]*	0.670 [1.870]*	
Urban			-0.012 [0.028]	
Constant	-4.188 0.013	-1.343 -0.004	0.248 0.058	-2.203
Province, urban interaction	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>No</b>
<u>Joint significance (p-values):</u>				
Age variables	0.0000	0.0000	0.0000	
Education variables	0.0599	0.0309	0.2204	
Pce (splines)	0.5911	0.4847	0.2598	0.0997
Prices	0.0052	0.0023	0.0778	0.0000
Province, urban interactions			0.0383	
Number of observations (2 x n)	524	524	524	524
R-squared	0.117	0.122	0.186	0.323

The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Dummy variables indicating missing parental education are included in the regressions but not reported. Standard errors are corrected for clustering at the individual level and heteroskedasticity. Absolute value of *t* statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 14. Smoking Intensity, IFLS2 and IFLS3 Panel Individuals , Male 20-59, OLS and Individual Fixed Effects**

	Dep var: Cigarettes smoked (log)			
	OLS			FE
	(1)	(2)	(3)	
<u>Age (spline):</u>				
20-24	0.019 [1.366]	0.017 [1.219]	0.015 [1.109]	
25-29	0.024 [2.770]***	0.024 [2.841]***	0.023 [2.766]***	
30-39	0.009 [2.339]**	0.008 [2.242]**	0.007 [1.833]*	
40-49	-0.005 [1.327]	-0.005 [1.331]	-0.004 [1.156]	
50-59	-0.012 [2.506]**	-0.012 [2.469]**	-0.010 [2.262]**	
<u>Own education</u>				
Some primary school (=1)	0.028 [0.862]	0.029 [0.900]	0.020 [0.638]	
Compl. primary school (=1)	0.020 [0.607]	0.017 [0.529]	-0.000 [0.014]	
Compl. junior high (=1)	0.123 [3.164]***	0.116 [2.979]***	0.060 [1.593]	
Compl. senior high (=1)	0.090 [2.473]**	0.080 [2.175]**	0.032 [0.890]	
Log pce (spline): 0-Rp 150,000	0.275 [7.221]***	0.279 [7.338]***	0.236 [6.401]***	0.146 [3.693]***
Log pce (spline): >Rp 150,000	0.094 [5.589]***	0.093 [5.532]***	0.082 [4.914]***	0.042 [2.309]**
Log price - cigarette (Rp)	-0.186 [5.690]***	-0.251 [6.790]***	-0.072 [1.868]*	-0.008 [0.215]
Log price - cooking oil (Rp)	-0.164 [3.196]***	-0.146 [2.834]***	-0.071 [1.305]	-0.070 [1.519]
Log price - sugar (Rp)	0.311 [5.704]***	0.123 [1.546]	0.154 [1.616]	0.049 [0.857]
Year dummy (2000=1)		0.213 [3.437]***	-0.025 [0.318]	
Urban			0.372 [4.441]***	
Constant	-1.803 [3.028]***	-0.214 [0.279]	-1.924 [2.097]**	0.801 [1.467]
Province, urban interaction	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>No</b>
<u>Joint significance (p-values):</u>				
Age variables	0.0000	0.0000	0.0000	-
Education variables	0.0012	0.0041	0.2892	-
Pce (splines)	0.0000	0.0000	0.0000	0.0000
Prices	0.0000	0.0000	0.0841	0.4463
Province, urban interactions	-	-	0.0000	-
Number of observations (2 x n)	7280	7280	7280	7280
R-squared	<b>0.047</b>	0.049	0.107	0.007

The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Standard errors are corrected for clustering at the individual level and heteroskedasticity. Absolute value of *t* statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 15. Probability of Starting to Smoke by 2000 for Nonsmokers in 1997, 15-19 Years Old**

Lagged variables (1997)	Dep var: smoking in 2000 =1			
	(1)	(2)	Changes (2000-1997)	(3)
<u>Age (spline):</u>				
Age	0.071	0.108		
	[0.222]	[0.335]		
Age squared	-0.002	-0.003		
	[0.200]	[0.326]		
<u>Mother's education</u>				
<i>Some primary school (=1)</i>	-0.007	-0.017		
	[0.146]	[0.322]		
<i>Compl. primary school (=1)</i>	-0.008	-0.025		
	[0.156]	[0.453]		
<i>Compl. junior high (=1)</i>	-0.073	-0.121		
	[0.992]	[1.585]		
<i>Compl. senior high (=1)</i>	-0.058	-0.047		
	[0.724]	[0.572]		
<u>Father's education</u>				
<i>Some primary school (=1)</i>	0.058	0.051		
	[0.943]	[0.825]		
<i>Compl. primary school (=1)</i>	0.086	0.086		
	[1.420]	[1.399]		
<i>Compl. junior high (=1)</i>	0.039	0.013		
	[0.514]	[0.164]		
<i>Compl. senior high (=1)</i>	0.043	0.037		
	[0.583]	[0.488]		
Log pce (spline): 0-Rp 150,000	-0.027	-0.033	Δ Log pce (spline): 0-Rp 150,000	0.021
	[0.386]	[0.460]		[0.367]
Log pce (spline): >Rp 150,000	-0.024	-0.033	Δ Log pce (spline): >Rp 150,000	0.02
	[0.766]	[1.057]		[0.773]
Log price - cigarette (Rp)	0.106	0.195	Δ Log price - cigarette (Rp)	-0.07
	[1.474]	[2.398]**		[0.989]
Log price - cooking oil (Rp)	0.214	0.235	Δ Log price - cooking oil (Rp)	-0.134
	[1.453]	[1.145]		[0.929]
Log price - sugar (Rp)	-0.044	-0.101	Δ Log price - sugar (Rp)	-0.016
	[0.496]	[0.960]		[0.216]
Year dummy (2000=1)		-0.069		
		[0.285]		
Urban	-1.688	-1.725	Constant	0.624
	[0.555]	[0.524]		[4.903]***
Constant	896	896		896
	0.014	0.062		0.003
Province, urban interaction	No	Yes	Province, urban interaction	No
<u>Joint significance (p-values):</u>				
Age variables	0.8305	0.9193		
Education variables	0.9053	0.7675		
Pce	0.6019	0.4222	Pce	0.6368
Prices	0.2050	0.0587	Prices	0.5608
Province, urban interaction		0.0107		
Observations (non-smokers in 1997)	896	896	Observations (non-smokers in 1997)	896
Number of smokers in 2000	402	402	Number of smokers in 2000	402
R-squared	0.014	0.062	R-squared	0.003

The sample are male age 15-19 in 1997 who were non-smokers. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Dummy variables indicating missing parental education are included in the regressions but not reported. Absolute value of t statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 16. Probability of Starting to Smoke by 2000 for Nonsmokers in 1997, 20-59 Years Old**

Lagged variables (1997)	Dep var: smoking in 2000 =1			
	(1)	(2)	Changes (2000-1997)	(3)
<u>Age (spline):</u>				
20-24	-0.037 [3.309]***	-0.035 [3.114]***		
25-29	-0.006 [0.673]	-0.006 [0.666]		
30-39	-0.001 [0.161]	-0.001 [0.357]		
40-49	-0.001 [0.334]	-0.001 [0.271]		
50-59	0.001 [0.129]	0.000 [0.025]		
<u>Own education</u>				
Some primary school (=1)	-0.031 [0.814]	-0.036 [0.957]		
Compl. primary school (=1)	-0.014 [0.393]	-0.020 [0.543]		
Compl. junior high (=1)	-0.067 [1.691]*	-0.074 [1.864]*		
Compl. senior high (=1)	-0.097 [2.709]***	-0.095 [2.585]***		
Log pce (spline): 0-Rp 150,000	-0.085 [2.328]**	-0.081 [2.189]**	Δ Log pce (spline): 0-Rp 150,000	0.064 [1.821]*
Log pce (spline): >Rp 150,000	-0.008 [0.535]	-0.009 [0.586]	Δ Log pce (spline): >Rp 150,000	-0.010 [0.639]
Log price - cigarette (Rp)	-0.012 [0.315]	-0.029 [0.738]	Δ Log price - cigarette (Rp)	0.048 [1.421]
Log price - cooking oil (Rp)	0.223 [2.590]***	0.153 [1.311]	Δ Log price - cooking oil (Rp)	0.025 [0.314]
Log price - sugar (Rp)	-0.035 [0.779]	-0.033 [0.617]	Δ Log price - sugar (Rp)	0.029 [0.775]
Urban		0.107 [0.754]		
Constant	0.826 [1.130]	1.197 [1.222]	Constant	0.100 [1.487]
Province, urban interaction	No	Yes	Province, urban interaction	No
<u>Joint significance (p-values):</u>				
Age variables	0.0000	0.0000		
Education variables	0.0049	0.0148		
Pce	0.0270	0.0398	Pce	0.1832
Prices	0.0633	0.5286	Prices	0.4003
Province, urban interaction		0.0001		
Observations (non-smokers in 1997)	1839	1839	Observations (non-smokers in 1997)	1839
Number of smokers in 2000	337	337	Number of smokers in 2000	337
R-squared	0.043	0.074	R-squared	0.004

The sample are male age 25-59 in 1997 who were non-smokers. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Absolute value of t statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.



**Table 17. Probability of Quitting by 2000 for Smokers in 1997, 15-19 Years Old**

Lagged variables (1997)	Dep var: not smoking in 2000 =1			
	(1)	(2)	Changes (2000-1997)	(3)
<u>Age (spline):</u>				
Age	0.297	0.318		
	[1.124]	[1.191]		
Age squared	-0.009	-0.009		
	[1.142]	[1.204]		
<u>Mother's education</u>				
<i>Some primary school (=1)</i>	-0.005	0.018		
	[0.144]	[0.512]		
<i>Compl. primary school (=1)</i>	-0.011	0.007		
	[0.279]	[0.172]		
<i>Compl. junior high (=1)</i>	-0.034	0.001		
	[0.616]	[0.014]		
<i>Compl. senior high (=1)</i>	-0.012	0.012		
	[0.185]	[0.175]		
<u>Father's education</u>				
<i>Some primary school (=1)</i>	0.057	0.067		
	[1.443]	[1.636]		
<i>Compl. primary school (=1)</i>	-0.031	-0.020		
	[0.762]	[0.480]		
<i>Compl. junior high (=1)</i>	-0.035	-0.042		
	[0.651]	[0.727]		
<i>Compl. senior high (=1)</i>	-0.033	-0.032		
	[0.615]	[0.569]		
Log pce (spline): 0-Rp 150,000	0.031	0.029	Δ Log pce (spline): 0-Rp 150,000	-0.022
	[0.580]	[0.513]		[0.527]
Log pce (spline): >Rp 150,000	-0.020	-0.015	Δ Log pce (spline): >Rp 150,000	0.011
	[0.788]	[0.550]		[0.526]
Log price - cigarette (Rp)	0.015	-0.006	Δ Log price - cigarette (Rp)	-0.002
	[0.301]	[0.116]		[0.041]
Log price - cooking oil (Rp)	-0.015	-0.263	Δ Log price - cooking oil (Rp)	0.159
	[0.137]	[1.661]*		[1.553]
Log price - sugar (Rp)	-0.039	-0.031	Δ Log price - sugar (Rp)	0.030
	[0.576]	[0.369]		[0.540]
Urban		0.229		
		[1.286]		
Constant	-2.479	-1.331	Constant	-0.051
	[0.984]	[0.494]		[0.614]
Province, urban interaction	No	Yes	Province, urban interaction	No
<u>Joint significance (p-values):</u>				
Age variables	0.4614	0.4646		
Education variables	0.2774	0.2446		
Pce	0.6945	0.8064	Pce	0.8054
Prices	0.8986	0.3555	Prices	0.3689
Province, urban interaction		0.2575		
Observations (smokers in 1997)	504	504	Observations (smokers in 1997)	504
Number of non-smokers in 2000	40	40	Number of non-smokers in 2000	40
R-squared	0.035	0.09	R-squared	0.007

The sample are male age 15-19 in 1997 who were smokers. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Dummy variables indicating missing parental education are included in the regressions but not reported. Absolute value of t statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 18. Probability of Quitting by 2000 for Smokers in 1997, 20-59 Years Old**

Lagged variables (1997)	Dep var: not smoking in 2000 =1			
	(1)	(2)	Changes (2000-1997)	(3)
<u>Age (spline):</u>				
20-24	-0.004 [0.699]	-0.004 [0.609]		
25-29	-0.000 [0.084]	-0.001 [0.264]		
30-39	0.003 [1.737]*	0.003 [1.921]*		
40-49	-0.003 [1.385]	-0.003 [1.461]		
50-59	0.008 [2.873]***	0.008 [2.941]***		
<u>Own education</u>				
Some primary school (=1)	-0.024 [1.600]	-0.024 [1.576]		
Compl. primary school (=1)	-0.019 [1.254]	-0.020 [1.324]		
Compl. junior high (=1)	-0.011 [0.608]	-0.009 [0.476]		
Compl. senior high (=1)	0.002 [0.123]	0.000 [0.029]		
Log pce (spline): 0-Rp 150,000	-0.011 [0.638]	-0.011 [0.662]	Δ Log pce (spline): 0-Rp 150,000	-0.002 [0.138]
Log pce (spline): >Rp 150,000	0.012 [1.563]	0.012 [1.531]	Δ Log pce (spline): >Rp 150,000	-0.012 [1.657]*
Log price - cigarette (Rp)	0.005 [0.296]	-0.017 [0.919]	Δ Log price - cigarette (Rp)	-0.002 [0.106]
Log price - cooking oil (Rp)	-0.069 [1.861]*	-0.068 [1.365]	Δ Log price - cooking oil (Rp)	0.066 [1.826]*
Log price - sugar (Rp)	0.008 [0.382]	0.036 [1.417]	Δ Log price - sugar (Rp)	-0.022 [1.201]
Urban		0.024 [0.493]		
Constant	0.742 [2.128]**	0.567 [1.219]	Constant	0.046 [1.486]
Province, urban interaction	No	Yes	Province, urban interaction	No
<u>Joint significance (p-values):</u>				
Age variables	0.0106	0.0071		
Education variables	0.2021	0.233		
Pce	0.2933	0.3044	Pce	0.2302
Prices	0.2826	0.2779	Prices	0.2218
Province, urban interaction		0.0013		
Observations (number of smokers in 1997)	4413	4413	Observations (number of smokers in 1997)	4413
Number of non-smokers in 2000	364	364	Number of non-smokers in 2000	364
R-squared	0.007	0.018	R-squared	0.002

The sample are male age 25-59 in 1997 who were smokers. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Absolute value of t statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Table 19. Overall price elasticities**

	Specification				
	1	2	3	4	5
<u>15- 19 year old</u>					
Two part model:					
1 <sup>st</sup> part probit, 2 <sup>nd</sup> part OLS	-0.142	-0.266	-0.115	-0.120	-0.121
Two part model:					
1 <sup>st</sup> part probit, 2 <sup>nd</sup> part GLM	-0.068	-0.187	-0.034	-0.036	-0.037
Tobit	0.344	0.207	0.077	0.096	0.053
GLM, unconditional	0.089	-0.003	-0.067	-0.082	-0.086
<u>20-59 year old</u>					
Two part model:					
1 <sup>st</sup> part probit, 2 <sup>nd</sup> part OLS	-0.179	-0.232	-0.059	-0.062	-0.063
Two part model:					
1 <sup>st</sup> part probit, 2 <sup>nd</sup> part GLM	-0.162	-0.211	-0.048	-0.049	-0.049
Tobit	-0.125	-0.098	-0.033	-0.033	-0.034
GLM, unconditional	-0.152	-0.152	-0.047	-0.049	-0.052
Year dummy	No	Yes	Yes	Yes	Yes
Province, urban, interactions	No	No	Yes	Yes	Yes
Language and religion dummy	No	No	No	Yes	Yes
Any older adult smoke in the hh	No	No	No	No	Yes

**Appendix Table 1. Smoking Intensity, Male 15-19, IFLS2 and IFLS3, GLM\***

	Dep. var: cigarette smoked (cig>0)				
	(1)	(2)	(3)	(4)	(5)
Age	0.457	0.469	0.303	0.312	0.313
	[1.100]	[1.133]	[0.720]	[0.737]	[0.740]
Age squared	-0.010	-0.011	-0.006	-0.006	-0.006
	[0.879]	[0.917]	[0.520]	[0.536]	[0.540]
<u>Mother's education</u>					
<i>Some primary school (=1)</i>	-0.026	-0.032	-0.059	-0.060	-0.060
	[0.497]	[0.611]	[1.124]	[1.138]	[1.131]
<i>Compl. primary school (=1)</i>	-0.036	-0.039	-0.039	-0.045	-0.045
	[0.540]	[0.584]	[0.594]	[0.730]	[0.724]
<i>Compl. junior high (=1)</i>	-0.201	-0.226	-0.224	-0.225	-0.227
	[2.206]**	[2.523]**	[2.617]**	[2.628]**	[2.638]**
<i>Compl. senior high (=1)</i>	-0.048	-0.064	-0.062	-0.089	-0.088
	[0.483]	[0.639]	[0.654]	[0.953]	[0.941]
<u>Father's education</u>					
<i>Some primary school (=1)</i>	-0.188	-0.184	-0.182	-0.191	-0.190
	[2.837]**	[2.794]**	[2.736]**	[2.998]**	[2.988]**
<i>Compl. primary school (=1)</i>	-0.161	-0.157	-0.156	-0.160	-0.158
	[2.249]**	[2.201]**	[2.236]**	[2.360]**	[2.339]**
<i>Compl. junior high (=1)</i>	-0.352	-0.357	-0.339	-0.349	-0.347
	[4.129]**	[4.180]**	[4.015]**	[4.209]**	[4.185]**
<i>Compl. senior high (=1)</i>	-0.150	-0.161	-0.157	-0.152	-0.150
	[1.573]	[1.684]*	[1.759]*	[1.734]*	[1.713]*
Log pce (spline): 0-Rp 150,000	0.102	0.115	0.100	0.099	0.099
	[1.220]	[1.380]	[1.152]	[1.150]	[1.149]
Log pce (spline): >Rp 150,000	0.025	0.023	0.026	0.020	0.022
	[0.643]	[0.601]	[0.692]	[0.524]	[0.572]
Log price - cigarette (Rp)	-0.281	-0.400	-0.246	-0.248	-0.249
	[3.730]**	[4.815]**	[2.780]**	[2.810]**	[2.820]**
Log price - sugar (Rp)	0.229	-0.096	-0.276	-0.276	-0.279
	[1.820]*	[0.522]	[1.078]	[1.094]	[1.103]
Log price - cooking oil (Rp)	0.194	0.226	0.233	0.226	0.226
	[1.870]*	[2.154]**	[2.139]**	[2.113]**	[2.116]**
Year dummy (2000=1)		0.368	0.338	0.352	0.357
		[2.688]**	[1.599]	[1.679]*	[1.703]*
Urban			0.736	0.743	0.744
			[3.490]**	[3.436]**	[3.439]**
<u>Language</u>					
Javanese				-0.003	-0.004
				[0.045]	[0.070]
Sumatranese				-0.011	-0.010
				[0.112]	[0.103]
Outer Island				-0.243	-0.240
				[2.328]**	[2.291]**
<u>Religion</u>					
Christian				0.193	0.193
				[1.331]	[1.337]
Hindu				0.130	0.127
				[0.831]	[0.811]
Buddha				-0.001	-0.002
				[0.002]	[0.004]

*(continued)*

Any older male smoke=1					0.024
					[0.346]
No older male=1					0.015
					[0.191]
Constant	-5.765	-3.243	-0.591	-0.930	-0.943
	[1.524]	[0.846]	[0.143]	[0.227]	[0.230]
Province, urban interaction	No	No	Yes	Yes	Yes
<u>Joint significance (p-values):</u>					
Age variables	0.0000	0.0000	0.0000	0.0000	0.0000
Education variables	0.0001	0.0000	0.0002	0.0001	0.0001
Pce (spline)	0.2562	0.2073	0.2659	0.3192	0.3056
Prices	0.0008	0.0000	0.0095	0.0084	0.0081
Language	-	-		0.1430	0.1530
Religion	-	-		0.5413	0.5427
Province, urban interaction	-	-	0.0000	0.0000	0.0000
Observations	1390	1390	1390	1390	1390

\* GLM with a log link function and a gamma family distribution. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Dummy variables indicating missing parental education are included in the regressions but not reported. Standard errors are corrected for clustering at the individual level. Absolute value of t statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

Appendix Table 2. Smoking Intensity, Male 20-59, IFLS2 and IFLS3, GLM\*

	Dep. var: cigarette smoked (cig>0)				
	(1)	(2)	(3)	(4)	(5)
<u>Age (spline):</u>					
20-24	0.027	0.027	0.025	0.025	0.026
	[3.427]***	[3.463]***	[3.287]***	[3.284]***	[3.401]***
25-29	0.020	0.020	0.020	0.020	0.020
	[3.433]***	[3.486]***	[3.611]***	[3.618]***	[3.561]***
30-39	0.006	0.006	0.005	0.005	0.005
	[2.361]**	[2.274]**	[1.871]*	[1.849]*	[1.906]*
40-49	-0.003	-0.003	-0.003	-0.003	-0.003
	[1.033]	[0.994]	[1.088]	[1.138]	[1.141]
50-59	-0.010	-0.010	-0.008	-0.008	-0.007
	[2.306]**	[2.325]**	[2.076]**	[2.021]**	[1.862]*
<u>Own education</u>					
<i>Some primary school (=1)</i>	0.041	0.041	0.029	0.026	0.025
	[1.563]	[1.569]	[1.160]	[1.026]	[0.983]
<i>Compl. primary school (=1)</i>	0.018	0.015	-0.000	-0.004	-0.004
	[0.690]	[0.604]	[0.019]	[0.141]	[0.151]
<i>Compl. junior high (=1)</i>	0.107	0.103	0.059	0.054	0.054
	[3.734]***	[3.577]***	[2.074]**	[1.890]*	[1.913]*
<i>Compl. senior high (=1)</i>	0.062	0.054	0.018	0.014	0.019
	[2.242]**	[1.958]*	[0.659]	[0.486]	[0.663]
Log pce (spline): 0-Rp 150,000	0.176	0.180	0.153	0.153	0.150
	[6.223]***	[6.327]***	[5.664]***	[5.640]***	[5.527]***
Log pce (spline): >Rp 150,000	0.132	0.131	0.123	0.121	0.121
	[10.849]***	[10.770]***	[10.455]***	[10.196]***	[10.212]***
Log price - cigarette (Rp)	-0.132	-0.181	-0.018	-0.019	-0.019
	[5.465]***	[6.454]***	[0.599]	[0.643]	[0.644]
Log price - cooking oil (Rp)	0.208	0.077	0.061	0.069	0.071
	[5.210]***	[1.372]	[0.882]	[0.994]	[1.017]
Log price - sugar (Rp)	-0.103	-0.089	-0.009	-0.016	-0.011
	[2.716]***	[2.379]**	[0.223]	[0.389]	[0.277]
Year dummy (2000=1)		0.152	-0.041	-0.042	-0.043
		[3.337]***	[0.705]	[0.714]	[0.714]
Urban			0.281	0.279	0.278
			[4.073]***	[4.047]***	[4.060]***
<u>Language</u>					
Javanese				-0.037	-0.038
				[1.916]*	[1.937]*
Sumatranese				0.050	0.051
				[1.687]*	[1.707]*
Outer Island				-0.060	-0.059
				[1.839]*	[1.812]*
<u>Religion</u>					
Catholic				0.008	0.010
				[0.259]	[0.333]
Hindu				-0.031	-0.028
				[0.575]	[0.519]
Buddha				0.134	0.146
				[1.327]	[1.378]

<i>(continued)</i>					
Any older male smoke=1					0.117 [4.442]***
No older male=1					0.104 [3.955]***
Constant	-0.605 [1.410]	0.466 [0.866]	-0.175 [0.258]	-0.216 [0.318]	-0.367 [0.536]
Province, urban interaction	No	No	Yes	Yes	Yes
<u>Joint significance (p-values):</u>					
Age variables	0.0000	0.0000	0.0000	0.0000	0.0000
Education variables	0.0001	0.0003	0.0370	0.0504	0.0515
Pce (spline)	0.0000	0.0000	0.0000	0.0000	0.7064
Prices	0.0000	0.0000	0.7811	0.7076	0.0000
Language	-	-	-	0.0159	0.0154
Religion	-	-	-	0.5432	0.5210
Province, urban interaction	-	-	0.0000	0.0000	0.0000
Observations	11039	11039	11039	11039	11039

\* GLM with a log link function and a gamma family distribution. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Standard errors are corrected for clustering at the individual level. Absolute value of t statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

**Appendix Table 3. Smoking Intensity, Male 15-19 IFLS2 and IFLS3, GLM\***

	Dep. var: cigarette smoked (cig>=0)				
	(1)	(2)	(3)	(4)	(5)
Age	3.336	3.348	3.608	3.691	3.786
	[4.791]***	[4.817]***	[5.201]***	[5.312]***	[5.338]***
Age squared	-0.083	-0.084	-0.091	-0.093	-0.096
	[4.262]***	[4.291]***	[4.644]***	[4.752]***	[4.798]***
<u>Mother's education</u>					
<i>Some primary school (=1)</i>	-0.015	-0.019	-0.063	-0.071	-0.051
	[0.161]	[0.204]	[0.634]	[0.697]	[0.493]
<i>Compl. primary school (=1)</i>	-0.112	-0.114	-0.187	-0.211	-0.191
	[0.943]	[0.962]	[1.571]	[1.808]*	[1.605]
<i>Compl. junior high (=1)</i>	-0.285	-0.302	-0.343	-0.390	-0.403
	[1.726]*	[1.826]*	[2.076]**	[2.370]**	[2.404]**
<i>Compl. senior high (=1)</i>	-0.302	-0.312	-0.419	-0.408	-0.376
	[1.704]*	[1.754]*	[2.361]**	[2.278]**	[2.036]**
<u>Father's education</u>					
<i>Some primary school (=1)</i>	-0.324	-0.323	-0.323	-0.317	-0.299
	[2.508]**	[2.503]**	[2.479]**	[2.466]**	[2.310]**
<i>Compl. primary school (=1)</i>	-0.497	-0.493	-0.491	-0.471	-0.459
	[3.643]***	[3.614]***	[3.644]***	[3.529]***	[3.390]***
<i>Compl. junior high (=1)</i>	-0.713	-0.717	-0.664	-0.616	-0.620
	[4.471]***	[4.478]***	[4.120]***	[3.799]***	[3.796]***
<i>Compl. senior high (=1)</i>	-0.656	-0.662	-0.623	-0.627	-0.585
	[3.841]***	[3.855]***	[3.702]***	[3.805]***	[3.493]***
Log pce (spline): 0-Rp 150,000	0.187	0.201	0.217	0.185	0.177
	[1.240]	[1.335]	[1.409]	[1.190]	[1.128]
Log pce (spline): >Rp 150,000	0.058	0.056	0.056	0.095	0.103
	[0.874]	[0.833]	[0.844]	[1.387]	[1.469]
Log price - cigarette (Rp)	0.089	-0.003	-0.067	-0.082	-0.086
	[0.653]	[0.018]	[0.390]	[0.469]	[0.495]
Log price - sugar (Rp)	0.272	-0.007	-0.130	-0.235	-0.442
	[1.175]	[0.022]	[0.300]	[0.534]	[0.984]
Log price - cooking oil (Rp)	-0.191	-0.163	-0.037	-0.093	-0.098
	[0.960]	[0.818]	[0.185]	[0.448]	[0.456]
Year dummy (2000=1)		0.305	0.404	0.522	0.722
		[1.280]	[1.111]	[1.414]	[1.904]*
Urban			0.048	0.099	0.133
			[0.121]	[0.251]	[0.333]
<u>Language</u>					
Javanese				0.116	0.101
				[0.906]	[0.785]
Sumatranese				0.267	0.289
				[1.494]	[1.610]
Outer Island				0.137	0.224
				[0.677]	[1.044]
<u>Religion</u>					
Christian				-0.132	-0.129
				[0.569]	[0.562]
Hindu				0.535	0.471
				[1.649]*	[1.422]
Buddha				-1.483	-1.565
				[2.201]**	[2.319]**



					<i>(continued)</i>
Any older male smoke=1					0.538 [4.331]***
No older male=1					0.703 [4.874]***
Constant	-34.482 [5.234]***	-32.413 [4.762]***	-34.610 [4.972]***	-33.919 [4.853]***	-33.531 [4.671]***
Province, urban interaction	No	No	Yes	Yes	Yes
<u>Joint significance (p-values):</u>					
Age variables	0.0000	0.0000	0.0000	0.0000	0.0000
Education variables	0.0000	0.0000	0.0000	0.0000	0.0000
Pce (spline)	0.1773	0.1585	0.1420	0.0834	0.0779
Prices	0.0205	0.8307	0.9544	0.8292	0.6389
Language	-	-	-	0.3238	0.2362
Religion	-	-	-	0.0406	0.0452
Province, urban interaction	-	-	0.0875	0.2047	0.1501
Observations	3696	3696	3696	3696	3696

\* GLM with a log link function and a gamma family distribution. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Dummy variables indicating missing parental education are included in the regressions but not reported. Standard errors are corrected for clustering at the individual level. Absolute value of t statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

Appendix Table 4. Smoking Intensity, Male 20-59, IFLS2 and IFLS3, GLM\*

	Dep. var: cigarette smoked (cig>=0)				
	(1)	(2)	(3)	(4)	(5)
<u>Age (spline):</u>					
20-24	0.040	0.040	0.037	0.037	0.047
	[3.682]***	[3.682]***	[3.355]***	[3.348]***	[4.097]***
25-29	0.033	0.033	0.033	0.033	0.034
	[3.986]***	[3.986]***	[4.008]***	[3.999]***	[4.022]***
30-39	0.005	0.005	0.004	0.005	0.007
	[1.364]	[1.364]	[1.158]	[1.196]	[1.655]*
40-49	-0.005	-0.005	-0.005	-0.005	-0.004
	[1.146]	[1.146]	[1.178]	[1.153]	[1.032]
50-59	-0.000	-0.000	-0.000	0.000	0.006
	[0.041]	[0.041]	[0.002]	[0.067]	[0.982]
<u>Own education</u>					
<i>Some primary school (=1)</i>	0.158	0.158	0.144	0.145	0.134
	[4.348]***	[4.347]***	[3.962]***	[3.970]***	[3.556]***
<i>Compl. primary school (=1)</i>	0.108	0.108	0.090	0.090	0.085
	[2.978]***	[2.978]***	[2.484]**	[2.480]**	[2.273]**
<i>Compl. junior high (=1)</i>	0.131	0.131	0.090	0.094	0.098
	[3.217]***	[3.217]***	[2.166]**	[2.260]**	[2.259]**
<i>Compl. senior high (=1)</i>	-0.062	-0.062	-0.082	-0.080	-0.043
	[1.546]	[1.539]	[1.993]**	[1.937]*	[0.994]
Log pce (spline): 0-Rp 150,000	0.212	0.212	0.189	0.190	0.170
	[5.390]***	[5.380]***	[4.902]***	[4.926]***	[4.123]***
Log pce (spline): >Rp 150,000	0.151	0.151	0.143	0.147	0.156
	[8.861]***	[8.856]***	[8.478]***	[8.628]***	[8.756]***
Log price - cigarette (Rp)	-0.152	-0.152	-0.047	-0.049	-0.052
	[4.456]***	[3.850]***	[1.126]	[1.145]	[1.129]
Log price - cooking oil (Rp)	0.271	0.271	-0.030	-0.026	0.002
	[4.954]***	[3.497]***	[0.316]	[0.270]	[0.023]
Log price - sugar (Rp)	0.028	0.027	-0.027	-0.019	0.030
	[0.533]	[0.533]	[0.488]	[0.353]	[0.500]
Year dummy (2000=1)		-0.001	0.142	0.136	0.176
		[0.017]	[1.710]*	[1.641]	[1.949]*
Urban			0.289	0.290	0.269
			[2.988]***	[3.001]***	[2.851]***
<u>Language</u>					
Javanese				0.004	-0.001
				[0.143]	[0.022]
Sumatranese				0.050	0.060
				[1.161]	[1.262]
Outer Island				-0.001	0.009
				[0.022]	[0.171]
<u>Religion</u>					
Christian				-0.069	-0.049
				[1.465]	[0.987]
Hindu				-0.144	-0.124
				[1.537]	[1.277]
Buddha				-0.314	-0.222
				[2.075]**	[1.225]

*(continued)*

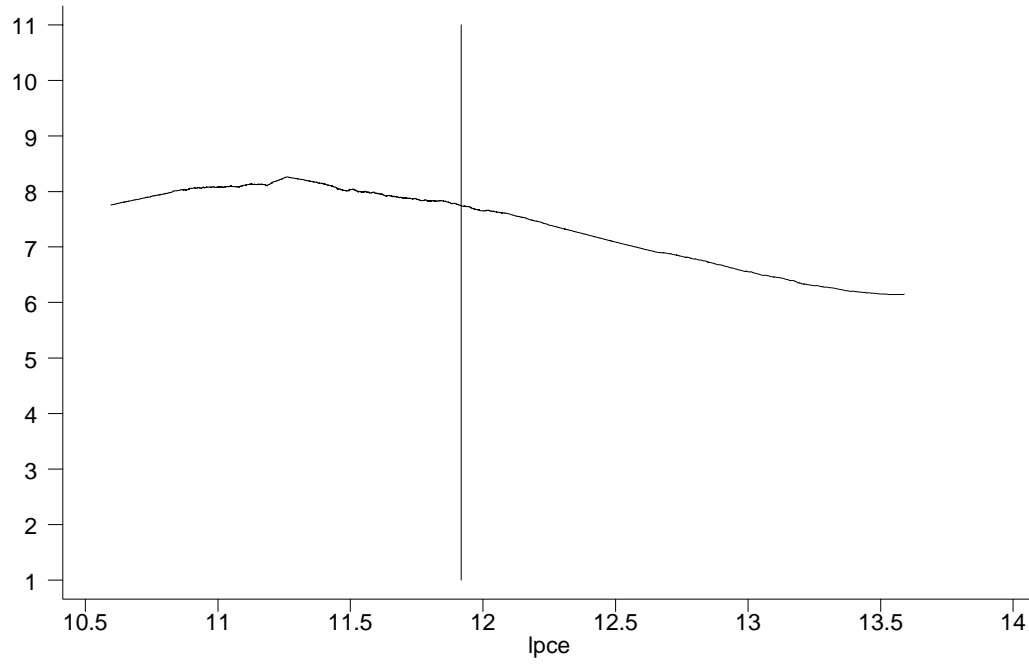
Any older male smoke=1					0.816 [20.365]***
No older male=1					0.604 [15.459]***
Constant	-3.270 [5.433]***	-3.277 [4.296]***	-0.314 [0.329]	-0.465 [0.489]	-1.836 [1.787]*
Province, urban interaction	No	No	Yes	Yes	Yes
<u>Joint significance (p-values):</u>					
Age variables	0.0000	0.0000	0.0000	0.0000	0.0000
Education variables	0.0000	0.0000	0.0000	0.0000	0.0000
Pce (spline)	0.0000	0.0000	0.6204	0.6506	0.6969
Prices	0.0000	0.0000	0.0000	0.0000	0.0000
Language				0.7128	0.6577
Religion				0.0378	0.2893
Province, urban interaction			0.0000	0.0000	0.0000
Observations	16144	16144	16144	16144	16144

\* GLM with a log link function and a gamma family distribution. The coefficients on log pce splines represent the marginal effects of a change in the slope for the intervals. Standard errors are corrected for clustering at the individual level. Absolute value of t statistics are in brackets with statistical significance at 10% (\*); 5% (\*\*); and 1% (\*\*\*) indicated.

Appendix Table 5. Elasticities, Two-part model

	Specifications									
	1		2		3		4		5	
	Marginal effects	Elasticities	Marginal effects	Elasticities	Marginal effects	Elasticities	Marginal effects	Elasticities	Marginal effects	Elasticities
<b><u>Participation Elasticities (Probit)</u></b>										
<u>15- 19 year old</u>	0.080	0.213	0.096	0.254	0.045	0.120	0.049	0.131	0.037	0.101
	[2.447]**		[2.502]**		[1.094]		[1.179]		[0.911]	
<u>20-59 year old</u>	-0.021	-0.030	0.046	0.065	0.012	0.017	0.013	0.019	0.015	0.021
	[1.343]		[2.530]**		[0.635]		[0.707]		[0.786]	
<b><u>Conditional demand Elasticities</u></b>										
<u>15- 19 year old</u>										
OLS	-0.355	-0.355	-0.478	-0.478	-0.327	-0.327	-0.333	-0.333	-0.334	-0.334
	[4.287]***		[5.182]***		[3.232]***		[3.289]***		[3.303]***	
GLM	-0.281	-0.281	-0.400	-0.400	-0.246	-0.246	-0.248	-0.248	-0.249	-0.249
	[3.730]***		[4.815]***		[2.780]***		[2.810]***		[2.820]***	
<u>20-59 year old</u>										
OLS	-0.149	-0.149	-0.202	-0.202	-0.029	-0.029	-0.032	-0.032	-0.033	-0.033
	[5.222]***		[6.114]***		[0.848]		[0.942]		[0.967]	
GLM	-0.132	-0.132	-0.181	-0.181	-0.018	-0.018	-0.019	-0.019	-0.019	-0.019
	[5.465]***		[6.454]***		[0.599]		[0.643]		[0.644]	
<b><u>Total price elasticities</u></b>										
<u>15- 19 year old</u>										
OLS in 2 <sup>nd</sup> part		-0.142		-0.266		-0.115		-0.120		-0.121
GLM in 2 <sup>nd</sup> part		-0.068		-0.187		-0.034		-0.036		-0.037
<u>20-59 year old</u>										
OLS in 2 <sup>nd</sup> part		-0.179		-0.232		-0.059		-0.062		-0.063
GLM in 2 <sup>nd</sup> part		-0.162		-0.211		-0.048		-0.049		-0.049

**Share of tobacco out of food, alcohol, and tobacco and *log* per capita expenditure, 1997**



**Share of tobacco out of food, alcohol, and tobacco and *log* per capita expenditure, 2000**

