Tobacco Usage at Household Level in Pakistan: Estimating Price and Income Elasticities of Tobacco Products

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Abstract

Despite persistent efforts for tobacco control, low-income countries are still facing challenges to implement tobacco control policies and programs successfully. The present study aimed to examine the household sector's tobacco usage and estimate price and income elasticities for policy measures to reduce tobacco use in Pakistan. The descriptive statistics, t-test for equality, and log-log model were applied to the PSLM 2018-19 surveys to investigate the magnitude, disparities, and effect of income and prices on quantity consumption of cigarettes, chewing, and other tobacco in terms of income and price elasticities. The results show that low-income households consume more cigarettes, chewing tobacco, and other tobacco products than households in the middle-income and high-income categories. The income elasticity of cigarettes is positive but less than unity, indicating that cigarettes are treated as a necessity commodity by households. The own-price elasticity for cigarettes, chewing tobacco, and other tobacco products is negative and less than unity, suggesting that tobacco products are inelastic. The cross-price elasticity provides mixed results, i.e., it can be both substitute and complement. Imposing an income tax on cigarette users could also be a policy strategy for reducing the number of cigarette and chewing tobacco users in Pakistan and the health risks associated with their usage.
Keywords: Tobacco, Household Sector, Price and Income Elasticities, PSLM 2018-19 Survey

Introduction

Tobacco usage is spreading like a pandemic and causing many preventable deaths and health problems across the globe (Alkan & Aba, 2020; Amin & Dogan, 2021; Garritsen et al., 2022; Mu et al., 2022; Li et al., 2023). Tobacco is one of the world's major preventable causes of premature death, which accounts for more than 8 million deaths worldwide. If the current pattern persists, then the number of tobacco-related deaths will be more than 10.3 million by 2030, among which 80 percent of deaths will be in Asian countries. This situation costs the global economy US$ 1.4

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trillion annually (Amin et al., 2023; Ji et al., 2023; WHO, 2021). The increasing trend of tobacco usage would have several harmful impacts on human health, such as cardiovascular diseases, cancer, respiratory diseases, and other diseases (Amin et al., 2021; Alvarez et al., 2020; Demissie et al., 2016). Furthermore, Alkan & Aba (2020) found that tobacco consumption is one of the five global mortality risks, along with high blood pressure, physical inactivity, high blood sugar, and extreme obesity. The expenditure on tobacco products affects the well-being of domestic households by reducing their disposable income and aggravating the public health care burden (Isik et al., 2023; Ameer et al., 2022; Sinha et al., 2017). The significant reasons for starting tobacco usage among young people are multi-faceted and complex, as they comprise psychological, economic, biological, social, and environmental factors. Among all, smoking and chewing tobacco among tobacco through family members, friends, and the general public are the most important reasons (Amin et al., 2020a; Amin et al., 2020b; Pérez et al., 2022; Carnicer-Pont et al., 2022).

As per the 2014 survey, it was identified that Pakistan is one of the most significant tobacco users worldwide, with 24 million active adult tobacco users. The current rate among men and women is 31.8% and 5.8%, respectively (GATS, 2014). In addition to the 160,000 tobacco-related deaths per year, Pakistan bears an annual economic loss of 198 billion Pakistani Rupee (US$1.3 billion) from tobacco-related mortality and morbidity (Yousaf et al., 2021; Saqib et al., 2018). Pakistan ranked among the top 15 countries with the highest burden of tobacco usage and related health diseases. Youngsters have a strong tendency to start smoking cigarettes, as approximately 1200 children/adolescents are starting to smoke every day (Amin et al., 2022; Sadiq et al., 2022; WHO, 2015). Tobacco is consumed in a variety of forms, ranging from smoking cigarettes, cigars, and bidi to chewing smokeless tobacco (Siddiqi et al., 2020). GATS (2014) estimated that 19.1% of the adult population in Pakistan consumes tobacco, of which 12.4% smoke while 7.7% use smokeless tobacco. The most dominantly used smokeless tobacco products are betel/betel quid (7.4%), naswar (7.2%), and gutka (6.4%) (Farooq et al., 2023; Kamran et al., 2023; GATS, 2014). The usage of this smokeless tobacco varies across regions due to variations in income level and consumer preferences. Most smokeless tobacco products are placed in the mandible or labial groove and suck for 10-15 minutes or applied to their gums (Gupta & Ray, 2003). Smokeless tobacco products are responsible for many types of mouth and throat diseases, among which cancer is one of the most common malignant diseases. The major factors responsible for the increasing usage of chewing tobacco products are availability, affordability, exposure through family and friends, and the misconception of medical use to improve toothache, headache, and relaxation. Moreover, it is usually observed that households consider smokeless tobacco relatively risky compared to cigarettes. The focus of the government efforts is also on managing the usage of a cigarette rather than tobacco as a whole (Gupta & Ray, 2003).

The most important reason to focus on tobacco consumption in this study is the medical evidence of a strong association between tobacco consumption and essential health problems. There has been a marked increase in the number of patients being treated for health problems caused by tobacco; this increase will lead to further increases in health-related expenditures if the necessary preventive measures are not taken. Also, increasing health expenditures cause hindrances in the economic development of a country.

Moreover, Pakistan is struggling to curb the menace of tobacco usage and related health issues; therefore, it joined the World Health Organization's Framework Convention on Tobacco Control (FCTC) in 2005. Trade and use of tobacco products are governed by the first principal ordinance (number LXXIII) of 1979 and the second principal ordinance (number LXXIV) of 2002. The first

ordinance mainly stresses the printing of health warnings on the packing of tobacco products. In contrast, the second ordinance allows multiple initiatives such as restrictions on public smoking, taxation, local sales to minors, health warnings, and banning advertisements. However, implementing these instructions could be more robust, as observed by national and international observer observers (Ongan et al., 2023; WHO, 2017). The increasing tobacco pandemic urges effective policies based on economic rationale and empirical evidence. In this regard, increasing prices through taxation policies can be a policy intervention to reduce tobacco usage and generate tax revenue for the government. Economic theory also urges higher prices through taxation to discourage use (Mushtaq et al., 2011).

After India, Pakistan is the second most prominent country where smokeless tobacco products (Paan and Gutkha) are widely used, with prevalence rates of 21.3% and 19.3% among men and women. More than 90% of oral cancer cases have been linked to the use of chewing tobacco (Kamal et al., 2013). The households of Pakistan are using tobacco in various forms; however, the magnitude and behavior of these tobacco products have not yet been adequately addressed and quantified. Among available studies, for instance, Nayab et al. (2020) have explored the own-price elasticities products by using budget shares of cigarette and chewing tobacco as dependent variables and investigated price elasticities of cigarette demand by employing the micro-level data. Similarly, Mushtaq et al. (2011) investigated the price elasticities of cigarettes by using time series data. Still, the existing empirical studies have not addressed the magnitude and policy strategies via price and income elasticities for reducing tobacco product usage at the household level in Pakistan.

The present study contributes, for the first time in the literature, examining the magnitude of tobacco products in the household sector and then estimates price and income elasticities for policy measures aimed at reducing tobacco product usage by utilizing data from the Pakistan Social and Living Standards Measurement (PSLM) survey 2018-19. The study found that cigarette and chewing tobacco users make up the most considerable portion of households in Pakistan. The critical policy implication is that increasing the prices of cigarettes, chewing gum, and other tobacco products will effectively reduce the consumption of these tobacco products. The findings of our study are highly relevant to Pakistan's tobacco control policies through the imposition of income tax and increased prices of tobacco products.

The remainder of the paper is organized as follows. Section 2 presents the literature review, and section 3 presents data and methods. Section 4 discusses the results and discussion, and the conclusion, policy implication, and future research are presented in Section 5.

Literature Review

Tobacco product usage and its determinants have been the subject of much research utilizing household-level information for a policy recommendation for reducing tobacco usage. For example, Nayab et al. (2020) investigated the price elasticity of tobacco products (i.e., cigarettes and chewed tobacco) while using micro-level data. The study findings confirmed the negative price elasticity for cigarettes and chewed tobacco; however, effective tax policies could curb tobacco usage and increase tax revenue through higher tobacco taxes. Using four cross-sectional surveys in Hong Kong, Sun et al. (2022) obtained variation in tobacco usage. Adeniji (2019) estimated the effect of price and income on tobacco demand while also considering household size and level of education. The results from the Quadratic Almost Demand System show that the price of tobacco has a negative, significant impact on tobacco demand, but the. Still, the quantity of

tobacco is reduced more for the national and rural samples in Nigeria than for the urban samples. As a result, raising the tax on tobacco products is an effective measure to reduce tobacco use.

The relationship between pricing, taxes, and the consumption of tobacco products was estimated by Guindon et al. (2015) while taking Latin America and the Caribbean into account. The results demonstrate that tobacco use can be decreased by raising tobacco prices and that taxes on tobacco products are a successful tool for reducing tobacco use. Cigarettes are confirmed to be negatively price inelastic according to Chelwa and Walbeek's (2019) estimation of the price response on cigarette demand for Uganda. An efficient way to reduce cigarette demand and raise additional revenue for the government is to raise the excise tax on cigarettes. Using various methodologies and models, the studies by Guindon et al. (2011), Selvaraj et al. (2015) for India, Martinez et al. (2015) for Argentina, Dare et al. (2021) for South Africa, Huque et al. (2023), Ahmed et al. (2022), and Ahmed et al. (2022) for Bangladesh estimated the factors that influence the use of tobacco products. However, the research found a significant negative influence of price on tobacco product use, and as income rose, so did tobacco product use. They argue that the best course of action to reduce tobacco use is to raise the price of tobacco products through the imposition of taxes on tobacco products.

After reviewing the relevant literature, to the best of our knowledge, the literature on tobacco usage at the household level in the case of Pakistan is limited by examining the magnitude and determinants of tobacco products while using the Pakistan Social and Living Standard Measurement (PSLM 2018-19) data set. This study tries to explore the following objectives to fill this gap and contribute to the existing literature:

Data and Methodology

This study uses household-level survey data from Pakistan Social and Living Standard Measurement (PSLM 2018-19). The Pakistan Bureau of Statistics (PBS) created and carried out the Pakistan Social & Living Standards Measurement Survey (PSLM) 2018–19, which collects data on various socioeconomic factors specific to Pakistani families. Demographic characteristics, migration and disability, education, ICT, health, employment and income, housing, water sanitation and hygiene, consumption of food and non-food items including tobacco products, solid waste management, assets held, durable household items owned, immunization and diarrhea, pre- and post-natal care, the Food Insecurity Experience Scale (FIES), and benefits from services and facilities are among these factors.

The households with a positive level of cigarette, chewing tobacco, and other tobacco use are divided into low, middle, and high-income households. The ratio of various tobacco products consumed and the total number of households in each income level is obtained to calculate the mean monthly tobacco product usage. According to the PSLM-2018-19 questionnaire, this study divides tobacco products into three categories: cigarettes, chewing tobacco, and others. The cigarette classification is generated with coding number 022001 (i.e., number of cigarettes consumed by household); the chewing tobacco is generated by summing raw tobacco with coding number 022003, and the other tobacco is generated by summing Gutka, Sonf Suparee, naswar, and betel nut with coding number 022006 and 022007. There are 11698 households with favorable tobacco products, while 4438, 4120, and 3140 households belong to the low, middle, and high-income categories, respectively. Various types of tobacco usage are evaluated in the first stage of the study. In the second stage, an econometric exercise is undertaken to estimate the income and price influence on tobacco products' usage.

Theoretical and Econometric Modeling

Following the economic theory and work of Adeniji (2019), the theoretical model used to quantify the usage of various tobacco products is specified as follows:

Households with positive quantity consumption of cigarette, chewing, and other tobacco types of low, middle, and high-income groups are presented in Table 2.

$$q_i = f(x, \ p_{cig}, \ p_{chew}, \ p_{other}) \tag{1}$$

Where qi is the quantity usage of i tobacco types as a function of household income (x), prices of cigarette cigarettes (p_{cig}), chewing tobacco (p_{chew}), and other tobacco (p_{other}). The tobacco types i are cigarette, chewing tobacco, and other tobacco categories, respectively. Following the work of Adeniji (2019), the econometric model of this study is specified as follows:

$$q_i = x^{\beta_1} \times p_{cig}{}^{\beta_2} \times p_{chew}{}^{\beta_3} \times p_{other}{}^{\beta_4} \times e^{\beta_0 + \varepsilon_i} \tag{2}$$

After logarithmic transformation, the models for cigarette, chewing tobacco, and other types of tobacco in matrix notations are specified as follows:

$$
\begin{bmatrix} lnq_{cig} \\ lnq_{chew} \\ lnq_{other} \end{bmatrix} = \begin{bmatrix} \beta_0 \\ \beta_0 \\ \beta_0 \end{bmatrix} + \begin{bmatrix} ln(x) & ln(p)_{cig} & ln(p)_{chew} & ln(p)_{other} \\ ln(x) & ln(p)_{cig} & ln(p)_{chew} & ln(p)_{other} \\ ln(x) & ln(p)_{cig} & ln(p)_{chew} & ln(p)_{other} \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \end{bmatrix} \tag{3}
$$

Since all variables are in logarithmic form, the coefficient associated with household income (i.e., β1) is income elasticity, and the coefficient of prices (i.e., β2, β3, and β4) are the prices of elasticity of cigarette, chewing, and other tobacco respectively. Based on the body of literature already in existence, the current study anticipates a positive, substantial impact on income, a negative, significant impact on the pricing of tobacco products, and a substitution effect between tobacco production that is being studied. Moreover, the weighted least square estimation technique is used to maintain the assumption of homoscedasticity and the properties of the least square method. The construction of variables is reported in Table 1.

Table 1 Construction of Variables

Variables	Unit	Measurement
lnq$_{cig}$	number	Monthly cigarettes consumed by the members of household households are then taken logarithmic according to the log-log linear model.
lnq$_{chew}$	Gm	Monthly chewing tobacco consumed by the members of household and then taking logarithmic according to the log-log linear model.
lnq$_{other}$	Gm	Monthly other tobacco consumed by the members of household and then taking logarithmic according to the log-log linear model.
ln(x)	local currency	Household monthly income Monthly other tobacco consumed by the members of household and then taking logarithmic according to the log-log linear model for income elasticity.
ln(p)$_{cig}$	local currency	It is constructed by taking the ration of expenditure made on cigarettes and quantity consumed by households and then taking logarithmic according to the log-log linear model for prices elasticities (i.e., own, and cross-prices elasticities).
ln(p)$_{chew}$	local currency	It is constructed by taking the ration of expenditure made on chewing tobacco and quantity consumed by households and then taking logarithmic according to the log-log linear model for prices elasticities (i.e., own, and cross-prices elasticities).

$\ln(p)_{other}$	local currency	It is constructed by taking the ration of expenditure made on other tobacco and quantity consumed by households and then taking logarithmic according to the log-log linear model for prices elasticities (i.e., own, and cross-prices elasticities).

Results and Discussions

Mean monthly tobacco products usage

The results in quantity usage of tobacco products are reported in Table 2, which confirms that low-income households consume 399 cigarettes, 1009.77 grams of chewing tobacco, and 738.78 grams of other tobacco products month-1 household-1 in more significant quantities than middle and high-income households. The households that belong to the high-income group consume the most miniature cigarettes (i.e., 375 cigarettes), chewing tobacco (i.e., 975.83 grams), and other tobacco (i.e., 445.03 grams) month-1 household-1. The primary conclusion from these findings is that when households' income brackets lie between the middle to the high-income range, they want to minimize their tobacco product usage.

Table 2 Mean monthly usage of tobacco types (household^{-1})

Tobacco types	Units	Income quartile		
		First quartile (Low-income Households)	Second quartile (Middle income Households)	Third quartile (High income Households)
cigarette	number	399.00	395.00	373.00
chewing tobacco	gm	1009.77	981.90	975.83
other tobacco	gm	738.78	673.46	445.03

Source: Author's calculation based on PSLM-2018-19 dataset.
Note: category of cigarette constructed considering its coding number 022001, Chewing tobacco is the sum of raw tobacco with coding number 022003, Gutka, Sonf Suparee with coding number 022006, and other tobacco is the sum of Naswar, betel nut etc. with coding number 022006 according to the questionnaire of PSLM-2018-19 dataset.

Determinants of Tobacco Products Usage

The results reported in Table 3 describe income and price impact on cigarette usage. The findings show that the price impact is negative on cigarette usage across all income categories, and the price effect confirms that cigarette usage reduces along with its price increase. However, there is a variation in scale price impact, as if cigarette prices increase by 1%, cigarette usage decreases by 0.82% of low-income households, higher than 0.73% reduction in middle-income households and 0.76% of high-income households. The income effect on cigarette smoking is statistically significant and positive (i.e., less than one). It indicates that cigarette smoking is considered a necessity in the household sector, and if income rises by 1%, cigarette use increases by 0.31% in the high-income group, which is higher than the 0.29% and 0.15% increases in the low and middle-income groups, respectively. Chewing tobacco has a positive pricing impact on cigarettes, indicating that households treat both substitute commodities. The price impact of other tobacco is positive and statistically significant on cigarettes, demonstrating that middle-income households treat them as alternative items. The findings of our study regarding own-price elasticity for cigarettes are consistent with the findings of (Gjika et al., 2020 Martinez et al., 2015, and Selvaraj

et al., 2015), where the coefficient of own-price elasticity turned out negative and less than unity. There is a contradiction with the findings of Nayab et al. (2017) and Gligorić et al. (202), where the coefficient of own-price elasticity for cigarettes was negative and more significant than unity. The coefficient of income elasticity for cigarettes turned out to be positive and less than unity, which is consistent with the finding of Adeniji (2019).

Table 3 Determinants of cigarette usage: *ln* (q cigarette)

	Middle-income	Middle high income households	High income Households
ln(income)	0.292**	0.155*	0. 312**
	(0.071)	(0.091)	(0.051)
ln(p$_{cigarette}$)	-0.827***	-0.737***	-0.760***
	(0.029)	(0.032)	(0.034)
ln(p$_{chewing\ tobacco}$)	0.309***	0.261**	0 .187***
	(0.037)	(0.043)	(0.034)
ln(p$_{others\ tobacco}$)	-0.055	0.171***	-0.130
	(0.056)	(0.023)	(0.027)
constant	4.246***	5.231***	3.787**
	(0.553)	(1.094)	(0.451)
observations	1900	1934	1820
Adj R^2	0.31	0.25	0.26
F-stat	332.83***	169.26***	161.01***

Source: Author's calculation based on PSLM-2018-19 dataset.
Note: Standard errors are in parentheses; observations are the number of households whose cigarette usage is positive. *** p<.01, ** p<.05, * p<.1. The results were based upon weight-by-weight regression analysis to maintain the homoscedasticity assumption of constant variance of random factor.

The chewing tobacco results reported in Table 4 confirm that the households of low-income groups consider it a necessity commodity. If a household's income rises by 1%, chewing tobacco usage rises by 0.09%. The price impact on chewing tobacco is harmful and statistically significant, indicating that households wish to reduce chewing tobacco intake as the price rises. Households consider other tobacco as a complementary item for chewing tobacco, as the price impact of other tobacco is negatively harmful and statistically significant. It confirms that as the price of other tobacco products rise, chewing tobacco usage decreases. The findings of the price impact of chewing and other tobacco products reveals that when the price of its own and other tobacco products rise, the household sector prefers to reduce the amount of chewing tobacco consumed. As a result, imposing a tax on chewing and other tobacco products can be an effective policy tool for reducing chewing tobacco usage. The findings of this study are consistent with Sun et al (2022).

Table 4 Determinants of chewing tobacco usage: *ln* **(q chewing tobacco)**

	Low income Households	Middle income Households	High income Households
ln(income)	0.097*	-0.068	-0.002
	(0.053)	(0.110)	(0.055)
ln(p_cigarette)	-0.094**	0.044	0.041
	(0.028)	(0.029)	(0.028)
ln(p_chewing tobacco)	-0.871***	-0.761***	-0.686***
	(0.026)	(0.032)	(0.037)
ln(p_others tobacco)	-0.151**	-0.084**	-0.112***
	(0.027)	(0.022)	(0.021)
constant	5.097***	6.498***	6.086***
	(0.413)	(0.908)	(0.484)
observations	2463	2136	1305
Adj R^2	0.33	0.23	0.25
F-stat	311.77***	160.99***	106.65***

Source: Author's calculation based on PSLM-2018-19 dataset.

Note: Standard errors are in parentheses; observations are the number of households whose cigarette usage is positive. *** p<.01, ** p<.05, * p<. 1. The category of chewing tobacco is the sum of raw tobacco with coding number 022003, Gutka, Sonf Suparee with coding number 022006, according to the questionnaire of PSLM-2018-19 dataset. The dependent variable, i.e., quantity usage of chewing tobacco, and the independent variables, i.e., income, price of cigarette, price of chewing tobacco, and price of other tobacco, are in logarithmic form. Therefore, the coefficients associated with independent variables are shown as elasticities. The results were based on weight-by-weight regression analysis to maintain the homoscedasticity assumption of constant variance of random factors.

Table 5 confirms that low-income households treat other tobacco use as a luxury, whereas middle-income households treat it as an inferior commodity. The price of cigarette impact demonstrates that low-income households treat other tobacco as a substitute for cigarettes. If the price of cigarettes increases by 1%, the size of other tobacco usage decreases by 0.75%. The identical results are obtained regarding chewing tobacco price impact on other tobacco in low and middle-income groups. However, there is a difference in the scale impact of price on other tobacco products. If the chewing tobacco price increases by 1%, other tobacco usage increases by 0.81% in low-income households and 0.46% in middle-income households. The own-price impact is negative and statistically significant on other tobacco, indicating that households would wish to limit their usage of other tobacco products as tobacco price rises. The findings of this study are consistent with Liu et al. (2021).

Table 5 Determinants of other tobacco usage: *ln* (q other tobacco)

	Low income Households	Middle income Households	High income Households
ln(income)	1.029*	-0.919*	0.134
	(0.395)	(0.490)	(1.421)
$ln(p_{cigarette})$	0.754*	-0.202	1.069
	(0.421)	(0.380)	(0.878)
$ln(p_{chewing\ tobacco})$	0.814**	0.466*	-0.081
	(0.223)	(0.280)	(0.579)
$ln(p_{others\ tobacco})$	-0.927***	-1.160***	-0.489*
	(0.087)	(0.117)	(0.201)
constant	-1.850	13.890*	3.073
	(3.029)	(6.450)	(12.402)
observations	75	50	15
Adj R^2	0.61	0.60	0.07
F-stat	30.46***	26.66***	1.421

Source: Author's calculation based on PSLM-2018-19 dataset.

Note: Standard errors are in parentheses; observations are the number of households whose cigarette usage is positive. *** $p<.01$, ** $p<.05$, * $p< 1$. The category of other tobacco is the sum of Naswar, betel nut etc. with coding number 022006 according to the questionnaire of PSLM2018-19 dataset. The dependent variable i.e., quantity usage of other tobacco; the independent variables i.e., income, price of cigarette, price of chewing tobacco, and price of other tobacco are in logarithmic form. Therefore, the coefficients associated with independent variables show elasticities. The results were based upon weight-by-weight regression analysis to maintain homoscedasticity assumption of constant variance of random factor.

Conclusion, Policy Implication and Future Research Directions

Despite all global efforts, the per capita consumption of tobacco is continuously increasing in Pakistan. All surveillance actions for tobacco control failed to provide evidence of progress in tobacco control because the implemented policies are not well developed and lack political and public support. It is the first study that empirically examines tobacco use in Pakistan. The pandemic of tobacco usage is increasing as the households of Pakistan are consuming various types of tobacco products. The current study adds to the existing literature by examining the household sector's tobacco use and estimating price and income elasticities for policy measures to reduce tobacco usage. Tobacco products are divided into three categories: namely cigarettes, chewing tobacco, and other tobacco. The Pakistan Social and Living Standards Measurement (PSLM 2018-19) dataset is utilized for descriptive and econometric analysis. The overall findings confirm that cigarette and chewing tobacco users make up the largest segment of households.

Tobacco taxes are an effective tool to control tobacco consumption. Therefore, raising tobacco product prices through the imposition of tax can be an effective policy strategy for reducing tobacco product users. The income impact finding indicates that households treat cigarettes as a necessity commodity. Imposing an income tax on cigarette users could also be a policy strategy for reducing the number of cigarette and chewing tobacco users in Pakistan and the health risks associated with their usage.

This study urges future research to figure out comparatively lower toxic tobacco products that can substitute cigarettes and other harmful tobacco products by surveying youth regarding the prospects and substitutes.

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Appendix A

Descriptive Statics of variables

Variables	Minimum	Maximum	Mean	Std. Deviation
lnq_{cig}	1.61	8.01	5.660	0.902
lnq_{chew}	0.00	9.80	1.321	2.648
lnq_{other}	0.00	6.62	0.012	0.270
$ln(x)$	5.93	11.14	8.295	.5427
P_{cig}	1.00	20.00	3.472	2.860
P_{chew}	0.00	1.20	0.093	0.208
P_{other}	0.00	116.67	0.661	4.388

Source: Author's calculation based on PSLM-2018-19 dataset.
Note: lnqcig, lnqchew, lnqother, and lnx stand for quantity of cigarette, chewable tobacco, other tobacco, and income in logarithemic. P_{cig}, P_{chew}, and P_{other} stand for price of cigarette, chewable and other tobacco.