Extended Cost-Benefit Analysis of Tobacco Consumption in Mexico by Gender

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Executive Summary

Public policy interventions aimed at reducing smoking in Mexico should consider the effects of smoker gender as a social determinant in policy design and implementation. Many gendered factors influence women's continued smoking, including lack of access to information about the harmful effects of tobacco use as well as physical, psychological, social, and economic stressors. Although such factors do not exclusively affect women, they impact the effectiveness of public policies aimed at reducing tobacco consumption. Men also face unique stressors that impact their responses to tobacco control measures. Additionally, metabolic differences exist in the way men and women process and eliminate toxic substances. As such, tobacco control measures may not be equally effective for men and women, raising the importance of a gender perspective in tobacco policy.

While numerous studies over the years have estimated the price elasticity of demand for tobacco in Mexico and elsewhere, estimates that differentiate between men and women are less common. This report calculates these elasticities for Mexico, with the aim of generating new evidence to inform public and fiscal policy that takes into account these differences between genders and their implications.

Using an extended cost-benefit analysis based on the calculation of price elasticities of demand for tobacco in women and men, this research finds that a 10-percent increase in price causes consumption to fall by 4.2 percent among women and 5.4 percent among men. These results suggest men are more sensitive to changes in price. This contrasts with what is commonly found in the literature—that women are more responsive to price changes—and should be corroborated with future estimations that include data from new surveys with complete information on individual income and tobacco consumption. Nonetheless, this finding may be indicative of gender-based changes in patterns of tobacco consumption in Mexico and the determinants of smoking.

Additionally, this study finds that a 33-percent increase in cigarette prices (resulting in a tax burden of 76.1 percent of a pack's retail price) would produce an 8.4-percent gain in disposable income for men, on average, and a 1.5-percent gain for women.

I. Introduction

It is important for public policy interventions to consider gender—whether target populations are identified as men or women—as a social determinant of health. Incorporating a gender perspective will help to deepen understandings of addictive behavior, its adverse effects on health, and how to address it among different groups.

Gender transcends biological sex. While sex is a biological characteristic, gender is a social construct involving attitudes, expectations, norms, behaviors, and individual societal roles. This study generally uses the term "gender," as it encapsulates the broader social influences that shape a person's experience, while it uses "sex" when referring to biological factors.

Chávez et al. (2013) report that sex, together with personality, increases the likelihood of developing addictions, given the metabolic differences in the processing and elimination of substances that pose a high risk to general and reproductive health. Similarly, Jiménez (2010) notes that smoking is a social practice that takes place in a cultural, economic, and political context in which social relations develop between men and women. As a result, ideally any study of tobacco consumption from a gender perspective should take into account the division of labor, gender norms, roles, the allocation of resources between men and women, and power relations, as well as the stereotypes created and the extent to which men and women identify with these models and beliefs. This study aims to provide foundational evidence for such future studies.

According to the *Report on Tobacco Control for the Region of the Americas 2022*, overall smoking prevalence in the region fell from 28 percent in 2000 to 16.3 percent in 2020. In the Americas, prevalence stands at 21.3 percent for men and 11.3 percent for women, compared to global figures of 36.7 percent and 7.8 percent, respectively. The report also notes that overall prevalence in Mexico in 2018 was 17.9 percent: 28.4 percent for men and 9.2 percent for women.

Meanwhile, the results of the most recent Global Adult Tobacco Survey (GATS) found no significant changes in smoking prevalence in Mexico between 2009 and 2023, with overall prevalence during this period falling from 16.5 percent to 15.6 percent. For men, this figure dropped from 25.4 percent to 24.3 percent, and for women, from 8.2 percent to 7.4 percent. Exposure to tobacco smoke was also reduced in homes and public places over the same period (CONASAMA, 2023). To continue this downward trend,

tobacco control strategies must be strengthened by considering gender in the design and implementation of public policy (PAHO, 2022).

In a context of increasing prominence of new and emerging tobacco products, as well as advances in legislation, Barrera-Núñez et al. (2023) highlight the importance of continually monitoring smoking in adolescents, women, and lower-income populations. Indeed, the global smoking pandemic is currently concentrated in low- and middle-income countries, and it is these segments of the population that are most strongly affected. Although smoking is initially most common among higher-income groups, the tobacco pandemic later spreads to the rest of the population, eventually becoming less prevalent in the higher socioeconomic strata as they gain greater awareness of its effects on health (Reynales-Shigematsu et al., 2022).

Reynales-Shigematsu (2012) note that, in Mexico, the smoking pandemic has reached the point where it is shifting from higher to lower socioeconomic levels in men. Among women, smoking remains on the rise; this is also the case for youth from higher socioeconomic backgrounds, who also exhibit lower rates of cessation and higher rates of initiation than men (Reynales-Shigematsu, 2012).

In Mexico, smoking habits change with age, sex, and income level. Smoking initiation in Mexico occurs on average at the age of 12, and there are more men than women daily smokers. The highest risk of smoking initiation is found among men at the age of 16 and at the age of 17 for women (Franco-Churruarin & Gonzalez Rozada, 2021b).

Although it used to be the case that smoking was associated chiefly with men, consumption by women has gained pace in recent years due to factors including changes in family norms, the rising participation of women in the labor market, income, purchasing power, and advertising campaigns (Reynales-Shigematsu et al., 2022).[1]

Cano-Bedoya et.al. (2022) and Jiménez (2010) have cited a few reasons why women who smoke continue to do so, such as caffeine and alcohol consumption, nicotine addiction, social interaction, a feeling of autonomy, and the desire to project an image. Additionally, stress is more likely to cause relapse in women than in men, and women also face factors including a lack of social and family support, fear of weight gain, and depression and anxiety.

[1] Mackay and Amos (2003) show that there are around 200 million women in the world who smoke, approximately 22 percent of women in developed countries smoke, and women smokers in developing countries outnumber those in developed countries. Even if prevalence levels do not rise, more women will smoke in the future due to the increase in the global population of women.

Other factors include unemployment and inactivity, as both can generate higher levels of stress, economic insecurity, and greater exposure to environments where tobacco consumption is more common. Additionally, the lack of social security and adequate health care reduces opportunities to receive support and treatment to quit smoking, perpetuating tobacco use as a way to cope with economic and emotional instability.

Meanwhile, WHO assume that the social and cultural limitations that once prevented women from smoking are disappearing, and it is rare to encounter targeted health education for women or gender-based smoking cessation policies. The evidence suggests that women find it harder to quit than men do, but that they are also more sensitive to price changes (WHO, 2007).

Although prevalence rates differ significantly between men and women, policies should aim to reduce tobacco consumption in both groups equally, incorporating the specific characteristics of each population subgroup to enhance their effectiveness. For example, address the increasing tobacco consumption among women and the consequences of the burden of disease care.

II. Background

Tobacco taxes and gender

To help meet the obligations of the World Health Organization (WHO) Framework Convention on Tobacco Control, the MPOWER action plan was introduced in 2008, which includes six cost-effective strategies to reduce smoking globally:

Monitoring tobacco use and prevention policies
Protecting people from second-hand smoke
Offering help to quit smoking
Warning about the dangers of tobacco
Enforcing bans on tobacco advertising, promotion, and sponsorship
Raising taxes on tobacco

Despite some progress in Mexico, areas of opportunity remain in monitoring tobacco use and raising taxes. The Pan-American Health Organization (PAHO) has noted a lack of recent, regular surveys to measure tobacco use in young people between 13

and 15 years of age (PAHO, 2022).[2] According to the WHO (2007), the most cost-effective way to reduce smoking is by raising prices through taxes. However, despite an increase in the tax share of the price of cigarettes—from 61.2 percent in 2008 to 67.6 percent in 2020—the share is still below the 75-percent minimum threshold recommended by the WHO to reduce smoking prevalence (noting, too, that this is only one benchmark of tax performance).

Tobacco control measures may not be equally effective in men and women, pointing to a need to include a gender lens in tobacco policy. Age, ethnicity, and socioeconomic status have played a role in tobacco advertising strategies, so it is important that tobacco control policies recognize gender-specific norms and responses for greater efficiency in combating tobacco use.

Part of the revenue raised from an increase in tobacco taxes could be allocated separately towards public policies that benefit women, youth, and other disadvantaged populations, such as indigenous groups and persons with a disability.

While increases in taxes would bring about a reduction in tobacco use, some smokers would seek cheaper cigarettes or use up their household income to support their habit. To further improve outcomes, governments and NGOs can benefit from understanding how tax and price systems impact men and women differently in order to introduce targeted policies that adequately counterbalance these factors. In a recent study, CIEP (2023) found implicit gender biases in the Mexican tax system,[3] both in value-added tax (VAT) and excise tax on production and services (IEPS). Both of these taxes are levied on tobacco products (CIEP, 2021).

It should be noted that tobacco is second only to motor fuel in the total amount of IEPS tax revenue generated. In addition, it is non-female-dominated[4] and male-headed households that spend the most on tobacco, while male-headed but female-dominated households spend the least on tobacco products (CIEP, 2023). Additionally, lower-income households allocate a greater share of expenditure to tobacco use, although

[2] In response, Mexico's National Commission of Mental Health and Addictions (CONASAMA) conducted the 2023–2024 National Survey of Mental Health and Addictions (Enasama) through interviews with adolescents between the ages of 12 and 17 and adults aged from 18 to 75.

[3] These biases refer to tax policy outcomes that differ by gender, despite uniform application of the policy to men and women. These gender inequalities may stem from social dynamics, economic preferences, and/or structural inequalities (Almeida, 2021; Intersecta, 2023).

[4] Here, a female-dominated household is defined as one in which more than half of members are female; a non-female-dominated household includes female members but these make up no more than 50% of all members (CIEP, 2023).

in absolute terms it is higher-income households that spend the most on tobacco (CIEP, 2023).

Similarly, data from the National Survey of Household Income and Expenditure, ENIGH (INEGI, 2022) show that male-dominated households spend 20 percent more than female-dominated households on products that incur IEPS. CIEP (2023) notes that men are greater contributors to the fiscal system, but this inequality is rooted in spending power, the gender pay gap, and the burden of unpaid work faced by women.

Literature review

Various studies have examined how excise taxes reduce tobacco consumption in Mexico (Ngo et al., 2022; CIEP, 2019), but most lack gender-disaggregated data. Only a few studies differentiate between men and women in estimating price elasticities and consumption trends, including work by Franco-Churruarin and Gonzalez-Rozada (2021b), Vázquez-Segovia et al. (2002), and Reynales-Shigematsu (2022).[5]

In previous research, CIEP (2019) estimated a total price elasticity of demand for tobacco of -0.42 in Mexico, meaning that a one-percent increase in the price of cigarettes would result in a decrease of 0.42 percent in quantity demanded. This elasticity value was used to calculate an optimal level of tax, defined as the tax rate necessary for revenue from IEPS to cover the direct and indirect costs of tobacco consumption. At the time, the optimum tax level was equivalent to a 5.3-fold increase in the specific component of IEPS on tobacco, which would have needed to rise from 0.35 to 1.85 pesos per cigarette. It was also found that the maximum possible revenue from IEPS on tobacco was 67.662 billion pesos, falling far short of the 91.026 billion pesos needed to cover the direct and indirect costs of smoking in 2018.

Furthermore, CIEP (2019) found that the decline in tobacco use would be more pronounced in lower-income than higher-income households; therefore, this excise tax–induced price increase would constitute a progressive policy. Although two-thirds of the population would face an increase in tobacco expenditure, the benefits from reduced spending on health care would compensate for the negative effects of the increased share of spending on tobacco.

[5] In Mexico, the main sources of statistical information on consumption by men and women are the National Survey on Drug, Alcohol, and Tobacco Consumption (ENCODAT) and the National Survey of Health and Nutrition (ENSANUT).

Meanwhile, using a general equilibrium model, Huesca (2021) found that a tax increase raising the specific component of IEPS to 1.50 pesos per stick in Mexico would reduce consumption by 26 percent. Such an increase would also result in a 49.3-percent increase in fiscal revenue from IEPS on tobacco (0.39 percentage points of GDP).

Separately, Franco-Churruarin and Gonzalez-Rozada (2021b) reported a greater prevalence of daily smokers among men (11.8 percent) than women (3.6 percent). They found that a 10-percent increase in the price of cigarettes would reduce the probability of daily smoking by 4.0 percent (4.3 percent in young people, 3.9 percent in middle-aged adults, and 4.4 percent in adults over 65). They also found that women were more sensitive to price changes than men and such a price increase would delay smoking initiation by two years in men and one year in women. Another important finding in their research is that a 10-percent increase in the price of cigarettes would reduce prevalence by 3.7 percent among higher-income groups and 4.4 percent among lower-income groups, suggesting that the tax burden would fall more on wealthier individuals.

Similarly, Reynales et al. (2022) estimated the distributional benefits, for men and women, of a 44-percent increase in the price of cigarettes in Mexico and found that this would lead 1.5 million people to quit smoking (351,300 women and 1.1 million men), entailing an 18-percent decline in consumption. In addition, 630,000 premature deaths would be averted, the health sector would save 42.8 billion pesos, and 250,000 people would be kept from falling below the poverty line (including 52,200 women). Another effect of this tax is an additional 16.2 billion pesos in revenue for the government, less than 3 percent of which would be paid by the lowest-income quintile.

In the same vein, Saenz-de-Miera et al. (2024) estimated that a 50-percent increase in the price of cigarettes would prevent 49,000 premature deaths over the next decade, while reducing tobacco-attributable costs by 155.5 billion pesos (87.9 billion in direct medical costs and 67.6 billion in indirect costs). Indirect costs include informal care, which accounts for more than a quarter of tobacco-attributable indirect costs (20 billion pesos). The burden of this care falls primarily on women, who represent between 70 percent and 80 percent of informal caregivers in Mexico and spend on average four hours more than men on unpaid care tasks in general Currently, fiscal revenue from tobacco tax barely covers 23.3 percent of the social costs of smoking. Tobacco tax increases would not only lower the burden of smoking-related diseases but would also

represent a cost-effective policy to mitigate economic and public health costs, while also reducing gender inequalities associated with caregiving.

Since men and women exhibit different patterns of tobacco use, it is worth examining these patterns to craft better strategies and policies to prevent and delay smoking initiation and promote smoking cessation.

III. Methodology

With the aim of generating more empirical evidence to understand the effects of tobacco taxation on men and women and inform distinct public policies that reduce smoking and redress gender health inequities, this section estimates price elasticities of tobacco for men and women in Mexico. Additionally, we describe the burden of smoking-associated diseases, disaggregated by gender, and estimate the effects of a tobacco tax increase in terms of health benefits, again differentiating by gender.

Problem statement:

There is currently insufficient available evidence to understand the effect of tobacco taxes on consumption and health in men and women.

Objective:

Generate evidence to support the design of gender-sensitive public and fiscal policy able to reduce smoking and redress gender health inequities.

Specific objectives:

- Estimate price elasticities of tobacco consumption by gender in Mexico.
- Describe the burden of disease associated with smoking, differentiating by gender.
- Estimate the effects of an increase in tobacco tax in terms of health benefits, differentiating by gender.

Price elasticities of demand by gender

Data

As mentioned above, gender goes beyond biological sex, but the available data sources do not include a gender variable. Nor do they include options for gender

nonconforming or other gender identities. As a result, this study uses the sex variable as a proxy for gender, referring to groups of male-identified individuals as men and female-identified individuals as women. In Mexico, this is a plausible assumption, as the findings of the National Survey on Sexual and Gender Diversity, ENDISEG (INEGI, 2021) suggest that 99 percent of adults in Mexico identify as cisgender.[6]

In 2019 and 2021, CIEP calculated the elasticity of tobacco consumption from the National Survey of Household Income and Expenditure (ENIGH). There are, however, two limitations to a gender-specific calculation using this survey. The first is that the survey does not report income and expenditure at an individual level but by household, making it impossible to determine individual expenditures on tobacco. The second is that the survey does not identify the smokers in each family, so it is not possible to determine which members of each household spend on cigarettes.

Furthermore, Mexico lacks an up-to-date survey specifically on smoking. The most recent information is that of the National Survey on Drug, Alcohol, and Tobacco Consumption (ENCODAT), which dates back to 2016. This survey presented a detailed analysis of addictions, following the requirements of the MPOWER measures and based on sociodemographic variables like sex, age, income level, and others.

Given the lack of gender-specific information in ENIGH, we took the information from the sex and age variables in ENCODAT and the two sets of data were merged using propensity score-matching techniques. This expanded the information available as both surveys are nationally representative. They also share many sociodemographic variables, such as number of household members, state, number of individuals self-identifying as Indigenous, speakers of an Indigenous language, education, and income, among others.

The ENIGH and ENCODAT surveys were matched to determine who smoked in the household. To do this, the two surveys were merged vertically (as a first step) with the following variables: number of household members, number of women in the household, number of men in the household, public medical insurance enrollment, sex, age, expenditure on tobacco, marital status, school attendance, occupation, state, number of individuals self-identifying as Indigenous, speakers of an Indigenous language, and education. Once the surveys had been merged, the propensity score-matching technique was employed; sex and age were the only variables used from the ENCODAT survey, which provided a sample of individuals aged 12 to 65 years and

[6] A cisgender person is someone whose sense of personal identity and gender corresponds to his or her sex at birth (Oxford English Dictionary, n.d.).

identified as male or female. In addition, ENIGH provided the household expenditure, expenditure on tobacco, quantity of tobacco, primary sampling unit (PSU), education, and household size variables. Lastly, we calculated elasticities following Deaton's (1997) methodology.

Processing and harmonization of surveys

Before matching the information, the ENIGH and ENCODAT databases were merged so they both showed results with the same classifiers. Monetary variables from ENCODAT were deflated to 2022 prices (the base year, as the ENIGH survey is from 2022); dummy variables were compared to ensure they had the same meanings; state codes were harmonized based on the ENIGH; and numerical variables were checked to ensure they were not encoded as strings of text. Lastly, the variables with the same information in ENCODAT and ENIGH were given the same name so they could be merged vertically (using the "append" command in Stata).

In this sense, the ENIGH data was pre-arranged; the population, household expenditure, and household summary databases (called "*población*," "*gastos hogar*," and "*concentrado hogar*," respectively, by INEGI) were merged with the aim of obtaining the socioeconomic information of each member. The limitation of handling the three databases separately is that "household expenditure" and "household summary" have households as their unit of analysis and "population" reports information at an individual level within households. As we required the sociodemographic information for each individual, it was necessary to merge the data, so the information from "household expenditure" and "household summary" was repeated for each individual in the merging process. For example, the income and expenditure of each individual will be the same as that reported by the head of the household for the entire household.

Similarly, in the ENCODAT survey, the household and individual databases were merged to report family information at the individual level. However, this information was not stored for all household members but only for those who reported they were smokers.

Nearest-neighbor propensity score matching

The two surveys were linked through propensity score matching, using the nearest-neighbor method. As reported by Steiner and Cook (2013), these techniques have been employed to compare populations with control groups linked by sociodemographic characteristics. While there is no control group in this study, the

surveys do share variables that could be used to link the two surveys based on the characteristics of their populations. Assuming that tobacco use can be explained by sociodemographic information, the two surveys are linked based on the following expression:

$$f(x, y, z) = f(y|x) \times f(z|x) \times f(x)$$

where *Y* is ENIGH, the main survey used to calculate elasticities, and *Z* is ENCODAT, the survey that provided information on gender and age. These two surveys are linked by the variables of the matrix *X*, made up of public medical insurance enrollment, sex, age, expenditure on tobacco, speaking an Indigenous language, number of women and men in the household, number of people in the household, self-identification as Indigenous, marital status, school attendance, occupation, education, and state of residence.

To match the two surveys, a probit model was used to determine the probability that an individual from the ENIGH survey has the characteristics of the smoker in ENCODAT—that is, the conditional probability that *y* is equal to 1 given the characteristics X of the individual x_i. Accordingly, a value of 1 indicates maximum likelihood it is the same individual; otherwise, where $y < 1$, this means there are limitations to recognizing the two individuals as identical given the socioeconomic information. In this sense, the closer the value is to 1, the more likely it is that the individuals share the same sociodemographic characteristics.

$$e(x_i) = P(y = 1|X = x_i) = g(x_i\beta)$$

$$\hat{e}(x_i) = g(x_i\beta) = \frac{1}{1 + e^{-x_i\beta}}$$

Matching of individuals from both surveys was restricted to pairs of individuals with a propensity score less than or equal to 0.05, calculated using the Euclidean distance, where x_{ki} are common variables from ENIGH and x_{kj} the variables from ENCODAT. The restriction $(x_{ki} - x_{kj})$ must be less than or equal to 0.05 to obtain the closest possible relationship in the characteristics of the individuals in the two surveys. This difference is calculated for each of the common variables selected (*k*) and for each individual in the survey (*i* for ENIGH, *j* for ENCODAT); the sum of the differences of each variable was squared and the square root was taken to obtain the score, based on the Euclidean distance equation:

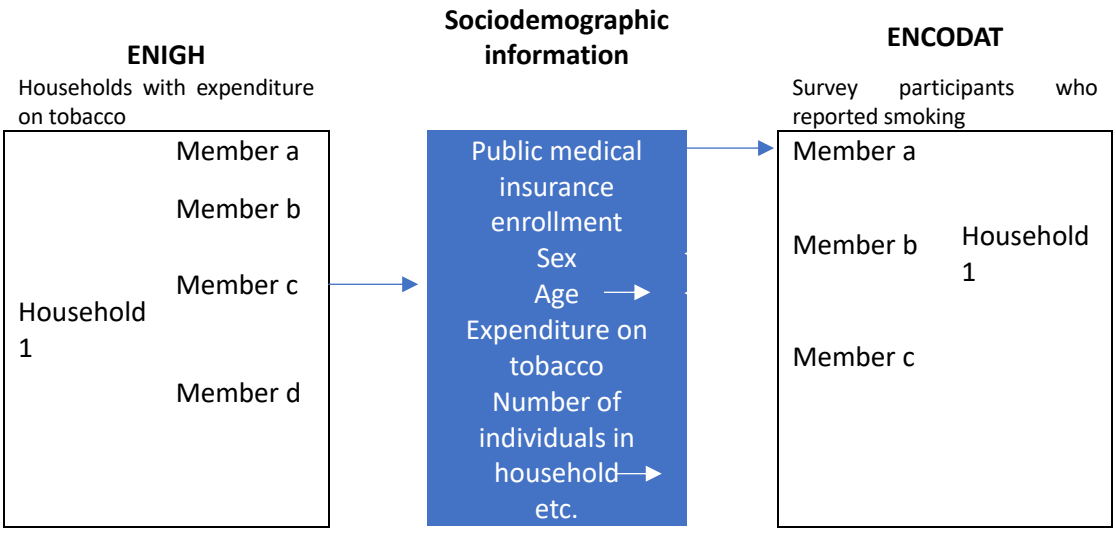
$$d(x_i x_j) = \sqrt{\sum_{k=1}^{k} (x_{ki} - x_{kj})^2}$$

Finally, this pairing was used to assign a folio to ENIGH for matching with ENCODAT. This will provide information on smokers in ENIGH, their sex (as a proxy for gender) and other sociodemographic characteristics to calculate gender-specific elasticities. The underlying assumptions in this methodology are:

a) due to the configuration of the ENCODAT survey, it is only possible to determine a maximum of two smokers per family;
b) individual tobacco quantity and expenditure is the same for all smokers in the household—that is, unit expenditure on cigarettes in ENIGH is not divided between the selected individuals from the household; and
c) there may be individuals in ENCODAT who resemble different individuals in ENIGH, so the sample composition is variable in the matching process.

The following diagram explains in detail the process by which the two surveys were matched.

Figure 1. Matching of variables



Once a folio has been assigned in ENIGH, this is used to merge the data with the selected individuals from ENCODAT, which is the last step of the nearest-neighbor matching process in Stata. After matching, we obtained a combined database of 9,942 individuals: 4,509 women and 5,433 men. This database contains the following

socioeconomic variables common to ENIGH and ENCODAT: number of household members, number of women in the household, number of men in the household, public medical insurance enrollment, sex, age, expenditure on tobacco, marital status, school attendance, occupation, state, number of individuals self-identifying as Indigenous, speakers of an Indigenous language, and education.

Furthermore, we added to the database the following variables, which were not used in matching but were taken from ENIGH to calculate elasticities: household expenditure, quantity of tobacco, and primary sampling unit (PSU). Note that, because only smokers were selected from ENCODAT, this final database contains indicators only for smokers who scored highly in the matching process.

Lastly, we retained variables necessary for the calculation of elasticities—sex, education, number of household members, PSU, quantity of tobacco, expenditure on tobacco, total household expenditure—and eliminated ones that would not be used.

Calculation of elasticities

After nearest-neighbor propensity score matching, Deaton's methodology can be used to calculate elasticities. The elasticity calculations followed the same methodology found in CIEP (2019) and John et al. (2023). This model identifies six steps for the estimation (John et al., 2023). The first step is to derive the unit value of tobacco:

$$u_{hc} = \frac{x_{hc}}{q_{hc}} \qquad (1)$$

where *u* is the unit value, *x* is expenditure, and *q* the quantity of tobacco products consumed in households *h* located in cluster *c*. This unit value is measured in cigarettes smoked by person *i*, for which we used the information reported by the ENIGH survey, with each cigarette equivalent to 0.75 grams[7] of the quantities reported in the "household expenditure" database.

The second step is to evaluate, based on an analysis of variance (ANOVA), whether the unit values vary spatially.

The third step is to estimate regressions of unit values and total expenditure on tobacco in the household, both within geographical clusters. The geographical clusters used were the primary sampling units (PSUs) taken from ENIGH and calculated by INEGI.

[7] We used the weight of prepared tobacco deemed equivalent to one cigarette pursuant to the Excise Tax on Production and Services Law (LIEPS) (DOF, 2022).

This geographical unit is a grouping of homes with different characteristics based on the surrounding environment: highly urban (*urbano alto*, settlements with 100,000 or more inhabitants), semi-urban (*complemento urbano*, settlements with between 2,500 and 99,999 inhabitants), and rural (settlements with under 2,500 inhabitants) (INEGI, 2022). The regressions after matching were constructed as follows:

$$lnv_{hc} = \alpha^1 + \beta^1 lnx_{ic} + \gamma^1 Z_{hc} + \psi ln\pi_c + u_c^1 \quad (2)$$

$$w_{hc} = \alpha^0 + \beta^0 lnx_{ic} + \gamma^0 Z_{hc} + \theta ln\pi_c + (f_c + u_c^0) \quad (3)$$

where u_{hc} is the unit value calculated in Equation 1, while lnXic is the natural logarithm of total expenditure of household *h* in cluster *c*; Z is the vector of household characteristics, in this case household size; and Z_{hc} are the sociodemographic characteristics taken as variables that influence tobacco consumption (sex, age, and education). Of the socioeconomic variables, only sex and age were taken from ENCODAT; the rest are from ENIGH.

For the budget share (Equation 3), w_{hc} represents the share of tobacco expenditure in total household expenditure, f_c is the arrangement of the cluster fixed effect and is added to the error u_c^0. Like in the unit value, the same household characteristics and sociodemographic variables are used. Lastly, for both equations, $ln\pi_c$ is the logarithm of unobserved prices, which are not considered until they are reconfigured with Equations 8 and 9.

The fourth step is to estimate cluster-level demand and unit value from the following equations:

$$\widehat{y_c^1} - = \frac{1}{n_c^+} \sum_{h=1}^{n_c^+} \left(\ln v_{hc} - \hat{\beta}^1 \ln x_{hc} - \hat{\gamma} z_{hc} \right) \quad (4)$$

$$\widehat{y_c^0} = \frac{1}{n_c} \sum_{n=1}^{n_c} \left(w_{hc} - \hat{\beta}^0 \ln x_{hc} - \hat{\delta} z_{hc} \right) \quad (5)$$

The fifth step identifies price variations between clusters. This step assumes no difference in tobacco prices within clusters. For this, we divide the covariance between $\widehat{y_c^0}$ and $\widehat{y_c^1}$ by the variance of y_c^1:

$$\hat{\phi} = \frac{Cov\left(\widehat{y_c^0}\ \widehat{y_c^1}\right) - \frac{\hat{\sigma}^{10}}{n_c}}{Var\left(\widehat{y_c^1}\right) - \frac{\hat{\sigma}^{11}}{n^+_c}} \quad (6)$$

In this equation, $n^{+}{}_{c}$ is the number of households with expenditure on tobacco and n_c the number of households in the cluster.

For the sixth and final step in Deaton's method of elasticity calculation, quality correction is applied to obtain the first result, the price elasticity of demand:

$$\widehat{\varepsilon_p} = \left(\frac{\hat{\theta}}{\bar{w}}\right) - \hat{\psi} \qquad (7)$$

where the variable $\bar{w}$ is the average share of household expenditure allocated to cigarettes. The estimates of coefficients $\hat{\psi}$ and $\hat{\theta}$ in Equations 2 and 3 above can be reconstructed as:

$$\hat{\psi} = 1 - \frac{\widehat{\beta^1}(\bar{w}-\hat{\theta})}{\widehat{\beta^0}+\bar{w}} \qquad (8)$$

$$\hat{\theta} = \frac{\hat{\phi}}{1+(\bar{w}-\hat{\phi})\zeta} \qquad (9)$$

$$\hat{\zeta} = \frac{\hat{\beta}^1}{\hat{\beta}^0+\bar{w}(1-\hat{\beta}^1)} \qquad (10)$$

Lastly, Deaton's method also estimates expenditure elasticity of demand based on the following equation:

$$\widehat{\varepsilon_1} = 1 + \left(\frac{\hat{\beta}^0}{\bar{w}}\right) - \hat{\beta}^1 \qquad (11)$$

Extended cost-benefit analysis of tobacco consumption by gender

The extended cost-benefit analysis seeks to estimate the impacts of a tax-induced price change on individual net disposable income. The methodology follows that proposed by Chaloupka et al. (2023), except for the use of income groups, because this analysis is gender-differentiated. The estimated cost-benefit analyses (by expenditure on cigarettes, medical expenses, and years of working life lost) are expressed in percentage changes and quarterly monetary values estimated from the previous matching results.

Data for scenario calculations

Following methodology outlined by CIEP (2019), two scenarios were calculated: the first with a specific tax of 0.5484 pesos,[8] which is the specific tax per stick in 2022 (status quo); and the second simulating a one-peso increase in specific tax, raising the specific tax levy to 1.5484 pesos per stick to exceed the minimum 75 percent tax share recommended by the WHO (2023). The two scenarios provided the price differential, enabling the calculation of gains. The tax burden was also calculated to determine the importance of the specific tax in the extended cost-benefit analysis.

Data for the calculation of disposable income resulting from tobacco expenditure

We used the elasticities calculated in the matching process, the price differential from the two scenarios and the total budget of the Secretariat of Finance and Public Credit, SHCP (2022). We also used average tobacco expenditure from the 2022 ENIGH survey and individual quarterly expenditure from the matching process.

Data for the calculation of disposable income resulting from medical expenses

To obtain expenditure due to smoking-related diseases differentiated by gender, we used the estimates and results from a report on the smoking-attributable disease burden in Mexico published by the Institute for Clinical Effectiveness and Health Policy (IECS, 2013), and subsequent updates. The IECS results were used in conjunction with data from the Secretariat of Finance and Public Credit (SHCP) to estimate expenditure associated with the treatment of smoking-related diseases from the public health budget and annual budget.

Expenditure on the treatment of smoking-related diseases was estimated using data by IECS (2020) on the burden of smoking-related disease treatment. Based on IECS estimates, 9.3 percent of the annual health budget is allocated to the treatment of smoking-related diseases. This amount is then divided by gender, based on the proportions presented by IECS (2013), using the following operation, where *i* represents men or women:

$$Expenditure\ on\ smoking\text{-}related\ diseases_i = [(Health\ budget_i) * 0.093] * Share\ of\ cost\ of\ treatment\ of\ smoking\text{-}related\ diseases_i \quad (12)$$

[8] This amount is set by the Excise Tax on Production and Services Law (LIEPS) of 2022: https://www.dof.gob.mx/nota_detalle.php?codigo=5639152&fecha=23/12/2021#gsc.tab=0.

The share of expenditure on the treatment of smoking-related diseases for men and women was calculated using the shares of the cost of treatment of smoking-related diseases reported by IECS (2020) for men and women, as a proportion of the total health budget. To divide the health budget between men and women $(Health\ budget_i)$, we used the Distribution Table of Unit Medical Costs for Workers, Pensioners, and their Family Members published by the Mexican Social Security Institute (IMSS, 2023). The cost table was used to obtain the total amount allocated to men and women receiving medical care from the IMSS. Cost by gender was divided by the total cost reported by the IMSS in the same table to obtain the share corresponding to each gender. This calculation took into account pensioners, workers, and their insured family members.[9]

Data for the calculation of disposable income resulting from life-years lost

In addition, we obtained 2021 data on years of life lost (YLL) associated with smoking, and differentiated by sex, from the Institute for Health Metrics and Evaluation (IHME, 2024). We also used the gender elasticity calculations presented earlier in this report. The share of smokers was taken from the data obtained after matching and CONAPO population figures.

Based on the elasticity calculations, the following equations can be used to determine (13) the change in tobacco expenditure, (14) the change in health expenditure, and (15) the increase in productivity resulting from the increase in number of years worked (Fuchs et al., 2018). The estimates of disposable income from the change in tobacco consumption, medical expenses, and years of life lost will yield the cost-benefit, expressed in percentage change and Mexican pesos per quarter. It should be recalled that the calculations assume a change to the specific tax in scenarios 1 and 2, meaning the changes would be observable in the medium and long term.

$$\Delta Expenditure_{i,j} = \Big((1+\Delta P)\big(1+\varepsilon_j * \Delta P\big) - 1\Big) * \frac{\omega_{ij0}}{Total\ budget_{j0}} \qquad (13)$$

where ΔP is the change in prices, εj is the price elasticity of tobacco by gender *j*, and ωij is the share of expenditure on cigarettes in the period. The change in tobacco

[9] This methodology for the cost distribution by gender, based on IMSS data, assumes that medical treatment received by men and women is the same for the entire population, even those covered by other health systems.

expenditure for men and women is presented as a share of total budget, averaged out by gender to quantify the total impact.

$$\Delta Expenditure\ on\ medical\ treatment_j = \Big(\big(1 + \varepsilon_j * \Delta P\big) - 1\Big) * \frac{Cost\ of\ treatment_j}{Total\ health\ budget_{j0}} \quad (14)$$

where the cost of treatment of smoking-related diseases by gender i is obtained from the calculations from the previous section. The equation shows the gains associated with the reduction in medical expenses resulting from a reduction in tobacco consumption, in the long term.

$$\Delta Forgone\ income_i = \Big(\big(1 + \varepsilon_j * \Delta P\big) - 1\Big) * \frac{YLL_i * Income_i}{Total\ expenditure_i} \quad (15)$$

To estimate the change in income from years of working life lost due to smoking, the number of years of life lost (YLL) is distributed proportionally to the number of smokers and as a proportion of the existing population. This factor is multiplied by income and divided by total expenditure per person. All the indicators were calculated for men and women to obtain differences by gender (*i*).

The total income effect (16) is calculated with the sum of the change in tobacco expenditure, plus the change in health expenditure, and the change of income from years of working life lost due to smoking. If the amount is positive, it means person have a gain; the opposite is a money lost due smoking.

$$\begin{aligned} Income\ effect = {} & Disposable\ income\ from\ change\ in\ tobacco\ expenditure \\ & + Disponsable\ income\ from\ decreased\ medical\ expenses \\ & + Disposable\ income\ from\ changes\ in\ years\ of\ working\ life \end{aligned} \quad (16)$$

IV. Results

Price elasticities of demand by gender

The general characteristics of the surveys studied are presented in Table 1, which shows a smaller sample of survey respondents in ENCODAT than in ENIGH. The ENIGH survey gives an approximate smoking households' prevalence of 3.2 percent

of the total population, while for ENCODAT this figure is 10.24 percent; both estimations consider households with at least one smoker, thus excluding the population of former smokers. Differences in prevalence could be due to the nature of the survey, as ENIGH does not specifically focus on tobacco-related topics.

Table 1. Population information for each survey

Population	2022 ENIGH	2016 ENCODAT
Sample size	309,534 individuals	56,877 individuals
Potential smokers between 12 and 65 years	4,159 families, approximately 9,964 potential smokers	7,973 individuals (5,601 identified as male and 2,372 as female)
Average quarterly expenditure on tobacco	1,436 pesos	809 pesos
Average quarterly quantity of tobacco	28.04 g (37.4 cigarettes)	450 cigarettes

Note: Observation count (with no expansion factor and in 2022 prices)

The probit estimation resulted in a 78.7-percent match, meaning that only 21.3 percent of smokers from ENCODAT had no relationship to any participant in ENIGH that met the restriction $(x_{ki} - x_{kj})$ less than or equal to 0.05. Subsequently, to calculate equations 2 and 3, we used the total household expenditure, household size, age, and maximum level of education variables (see Appendix).

The unit value and budget share regressions were calculated first for overall elasticity, second with the data for women, and third with the data for men. The elasticities can be observed in Table 2, which shows that consumption declines to a greater extent among men when cigarette prices increase. A 10-percent increase in price leads to a decline in consumption by men of 5.3 percent, while women reduce their consumption by 4.2 percent.

Table 2. Elasticity results by gender

Elasticity	Expenditure elasticity	Price elasticity	Observations	Adjusted R^2	F-statistic
Overall	0.1345	**-0.4743**	9366	0.7339	12.4878
Women	0.1345	**-0.4233**	4355	0.6781	5.3543
Men	0.1876	**-0.5395**	5011	0.6530	5.3371

Source: Estimates by CIEP with information from INEGI (2022) and ENCODAT (2016)

Extended cost-benefit analysis

Main estimation parameters

Estimated costs to treat smoking-related diseases totaled 75.745 billion pesos in 2022, based on the fact that these conditions account for 9.3 percent of Mexico's annual health budget (IECS, 2020). Most of this amount, 81.6 percent, is spent on providing care for smoking-related conditions in men, leaving 18.4 percent to treat these conditions in women (IECS, 2013). At a total of 814.468 billion pesos, the 2022 health budget represented 10.7 percent of Mexico's total budget; 44.6 percent of this amount was allocated to women and 55.4 percent to men (Table 3). These percentages were obtained by adding the totals for women and men from the tables of unit medical costs for workers, pensioners, and their family members, published by the IMSS (2023).

Table 3. Health care costs for smoking-related diseases in Mexico by gender, 2022

	Women	**Men**	**Total**
Health care costs for smoking-related diseases	14.153 billion pesos (18.4%)	61.791 billion pesos (81.6%)	75.745 billion pesos (9.3% of health expenditure)
Health budget	363.253 billion pesos* (44.6% of total health budget)	451.216 billion pesos* (55.4% of total health budget)	814.468 billion pesos (10.7% of total expenditure)

Source: Estimates by CIEP with information from IECS (2013), IMSS (2023), SHCP (2022), and INEGI (2022)

Nationwide, in 2021, smoking-related diseases claimed 39,509 lives in Mexico; women accounted for 24.2 percent of these deaths, while 75.8 percent occurred in men. Years of life lost (after death caused by smoking) totaled 948,905 years for all smoking-related deaths. Men lost 24.5 years of life, and women 22.6 years, as a consequence of diseases caused by smoking (Table 4).

Table 4. Burden of smoking-related disease in Mexico by gender, 2021

	Overall	Women	Men
Deaths	39,509	9,556	29,952
	(100%)	(24.2%)	(75.8%)
DALYs	1,160,879	297,290	863,589
	(100%)	(25.6%)	(74.4%)
YLL	948,905	215,759	733,147
	(100%)	(22.7%)	(77.3%)
YLD	211,974	81,531	130,443
	(100%)	(38.5%)	(61.5%)

Source: Prepared by CIEP with information from IHME (2024)
DALYs: Disability-adjusted life years
YLL: Years of life lost
YLD: Years lived with disability

Lastly, the cost of the burden of smoking-related disease, calculated by IECS, was divided by the total health budget for men and women. This shows that 4.7-times more funding is allocated to treating smoking-related conditions in men than in women. This is primarily due to the fact that the proportions calculated by IECS (2013) indicate higher costs for men than women, given that the burden of smoking-related disease is greater in men.

Taxes and scenario definition

Gains were calculated by estimating taxes under two scenarios. The 2022 status quo results in a tax burden of 68.5 percent given a specific IEPS of 0.5484 per stick. The second scenario, based on a simulated specific tax of 1.5484 pesos, yielded a tax burden of 80.9 percent. Both scenarios were calculated using 2022 data and parameters, with the aim of showing the importance of updating the specific tax and the influence of elasticities in each estimation.

The estimates in Table 5 were used to calculate the necessary price change for Equations 13 and 14. Based on the results, a specific IEPS of 1.5484 pesos in the simulated scenario results in a 33-percent price increase with respect to the status quo.

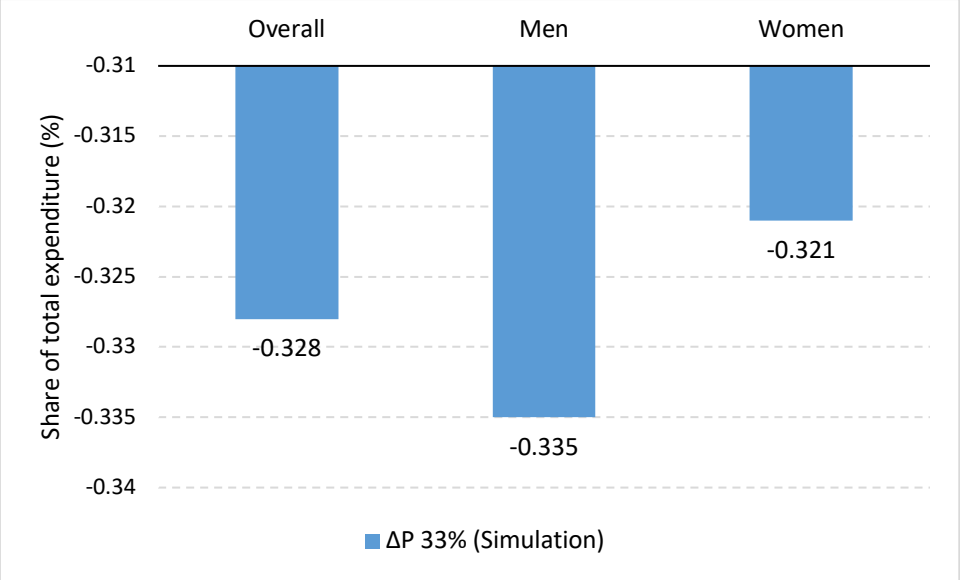
Table 5. Tax burden results by scenario

Year	2022 status quo	Simulation
Specific IEPS per cigarette	0.5484	1.5484
Ad valorem IEPS per pack	1.6	1.6
Elasticity	-0.4743	-0.4743
Calculous of a 20-stick pack of cigarettes:		
Retailer price per pack	**62.2**	**82.6**
Price excluding VAT	53.6	71.2
Retailer margin	5.2	6.9
Price without retailer margin	48.4	64.3
Specific IEPS	11	31
Price without specific IEPS	37.5	33.3
Ad valorem IEPS	23.1	20.5
Wholesale price	14.4	12.8
Tax burden	**68.5%**	**76.1%**

Cost-benefit of change in personal expenditure due to change in tobacco use

The calculation of changes in spending on tobacco (see **Figure 2**) found that the simulated 33-percent increase in the price of cigarettes would result in a 0.328-percent average decline in quarterly expenditure per person, equivalent to 174 pesos not spent on tobacco. This decrease in tobacco spending would be more pronounced in women, who would spend 205 pesos less per quarter (0.321 percent of total expenditure), while men would spend 134 pesos less (0.335 percent of total expenditure). These results demonstrate a decrease in tobacco spending due to the increased tax burden, a result of the one-peso increase in specific tax compared to the 2022 status quo.

Figure 2. Change in total expenditure of smokers, given the tax-induced increase in cigarette prices by gender



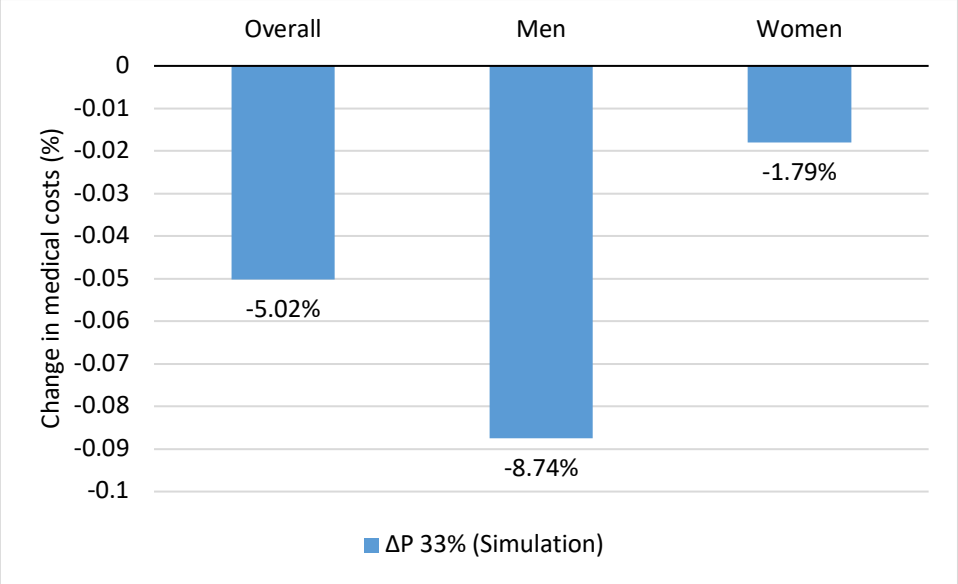
Cost-benefit due to change in medical expenses

Medical costs associated with smoking-related diseases would decrease as a result of the tax change (see **Figure 3**). This decline in personal medical expenses is due to the decrease in tobacco use and associated health harm.

Men would be the chief beneficiaries, as the increased tax burden and associated 33-percent price increase would lead to an 8.7-percent reduction in men's smoking-related medical costs, while these costs for women would fall by 1.8 percent. These gender differences can be explained primarily by the fact that smoking-related medical costs are greater for men than women (IECS, 2013), although we note some other considerations that fall outside the scope of this research. These include the gender gap in access to health services and differences in disposable income between men and women, which may introduce bias into these results.

Although men would benefit more from the tax increase, gender-specific social stigmas could hinder their access to medical services, limiting the positive impact of reducing tobacco consumption. On the other hand, women face different, additional obstacles such as lower economic independence, greater caregiving responsibilities, and less time available to visit the doctor, which could affect the impact of the fiscal policy. A deeper analysis would help better understand its scope and limitations.

Figure 3. Change in medical costs associated with smoking-related disease by gender



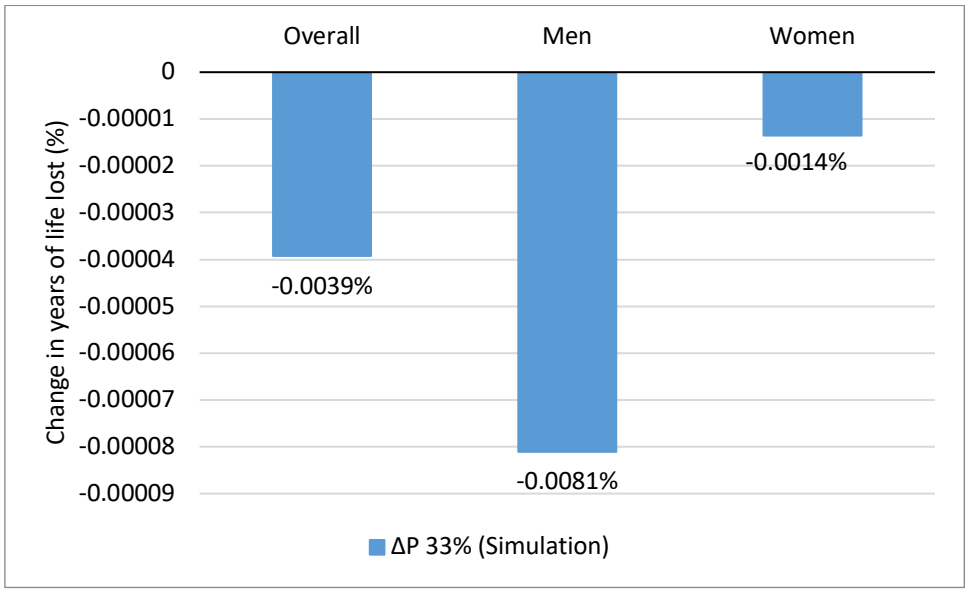
Cost-benefit due to decrease in years of lost working life

Years of lost working life due to tobacco use decrease as smoking decreases (see **Figure 4**). Put another way, smokers gain years of working life by reducing their use of tobacco. Overall, a 0.0039-percent decrease is observed in years of lost working life due to smoking. After the increase in cigarette prices, smokers would gain 1.28 years due to decreased tobacco consumption, boosting their life expectancy and thus, the number of years of working life.

Men stand to gain the most, exhibiting a 0.0081-percent decrease in years lost (an increase of 2.3 years of working life), while a change of -0.0014 percent is observed in women (an increase of 0.09 years). This difference is due primarily to the fact that men lose a greater number of years of working life as a consequence of smoking-related diseases, as reported in estimates for 2021 by IHME (2024) (**Table 4**).

The years of working life gained would translate into an increase in income equivalent to an average of 332,480 pesos per person per year (334,264 pesos for men and 330,392 pesos for women).

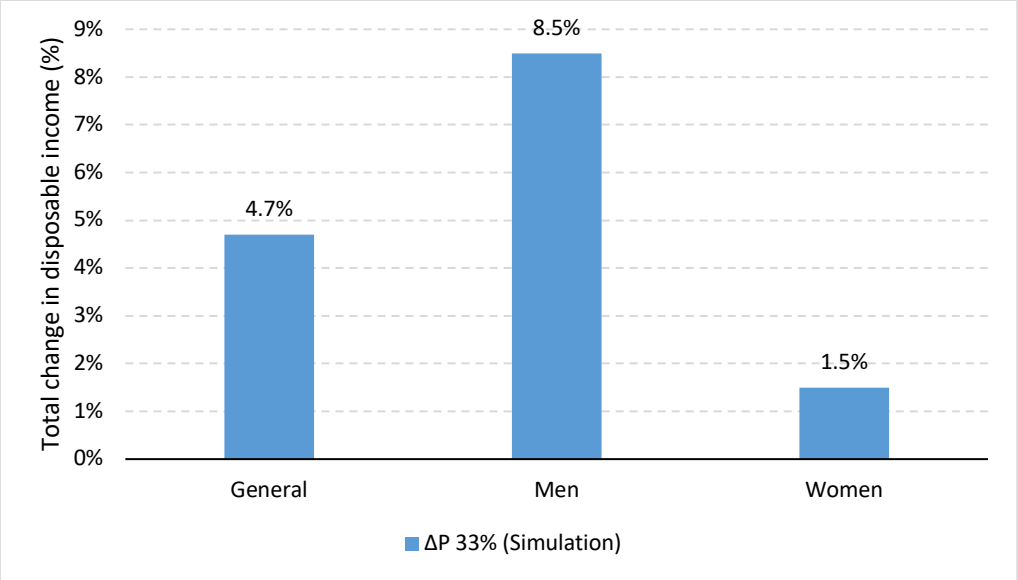
Figure 4. Changes in years of working life lost given the change in tobacco expenditure by gender



Gains in disposable income from the total cost-benefit calculation

Equation 16 was used to calculate the income effect and found an increase in disposable income of 4.7 percent due to the combined effect of changes in tobacco consumption, lower medical expenses, and the reduction in years of life lost. Men would gain the most, enjoying an 8.4-percent increase in disposable income, while disposable income for women would rise by 1.5 percent (Figure 5).

Figure 5. Net effect on smokers' disposable income by gender



V. Conclusions

Smoking has adverse effects on health and household disposable income, while also straining public finances. The costs of widespread smoking in a population affect government resources and national health services.

One of the most effective and cost-effective policies to discourage smoking is to raise cigarette prices through taxes. While the literature includes a number of studies that estimate the price elasticity of tobacco, few distinguish between men and women who smoke. This is important given the potential for implicit gender biases in fiscal policy, both in income and public spending. Furthermore, other factors such as the gender pay gap, the burden of unpaid labor, and consumer preferences generate inequalities between men and women in their contribution to the tax system.

This research proposed an extended cost-benefit analysis based on the calculation of price elasticities of demand for tobacco in men and women. The results showed that, given a 10-percent increase in price, women reduce their consumption by 4.2 percent, while men do so by 5.4 percent. Men who smoke are, therefore, more responsive to price changes. This contrasts with what is commonly found in the literature—that women are more sensitive to changes in price—and should be corroborated with future estimations based on new surveys with complete information on individual income, expenditure, and tobacco consumption. Nonetheless, this finding may be relevant as it could be indicative of gender-based changes in the patterns and determinants of smoking in Mexico. Historically, gender norms helped keep smoking levels lower among women, but these norms are changing, and social pressures on young women to smoke may now be increasing. Additionally, the growing participation of women in the labor market may be contributing to higher smoking rates, as more women have gained access to a higher disposable income.

After calculating elasticities by gender, we simulated a scenario in which specific IEPS was raised by one peso per stick and determined the percentage change in price and tax burden. This simulation was used to conduct a cost-benefit analysis of tobacco consumption in Mexico, medical costs due to smoking-related diseases, and years of working life lost due to smoking. The results of these three types of cost-benefit analyses are summed to determine total gain or loss from a tax-induced price change.

The results show that men are more inclined to reduce their tobacco use after a price increase, and it is also men who would gain the most, enjoying the greatest increase

in disposable income as a result of lower spending on cigarettes and medical expenses and fewer years of working life lost. Given a 33-percent increase in cigarette prices (with a tax burden of 76.1 percent), men would experience an 8.4-percent increase in disposable income on average, while women would see an increase of 1.5 percent. This difference is largely due to men being more responsive to price increases, leading to a more significant reduction in tobacco consumption. In contrast, women may experience a smaller impact due to different consumption patterns, socioeconomic factors, and social pressures related to smoking.

The results of this study suggest that the smoking pandemic is on the rise and is having the strongest impact on women, who exhibit lower rates of cessation than men, as reported for example in work by Reynales-Shigematsu (2012) and Reynales-Shigematsu et al. (2022). Other factors that may be contributing to this behavior include the increase in women's participation in the labor market and income, changes in family behavioral norms, advertising campaigns, a lack of information on the harmful effects of smoking, and stress (Reynales-Shigematsu et al., 2022; Barrera-Núñez et al., 2023).

The limitations of this research include, first and foremost, the differences between the two surveys used, ENCODAT and ENIGH, which are based on different units of observation: the individual for the former, and the household for the latter. This influenced the calculation of results at an individual level, as ENIGH fails to identify who smokes within a family, or whether smokers are male or female. The score-matching methodology created profiles with similar sociodemographic characteristics, despite these differences in the way the surveys were conducted.

In addition, although we conclude that a tax increase policy would primarily benefit men, the figures for the cost-benefit analysis of medical costs and years of lost working life, in particular, should be treated with caution. Indeed, this research does not take into account gender gaps in access to health services and in unpaid labor, which may influence the calculation of smoking-related health care costs. Moreover, due to insufficient data, this study does not take into account gender-nonconforming individuals. As these data become more consistently available, future studies should investigate differential impacts among these groups as well.

A fiscal policy aimed at reducing tobacco consumption would affect both men and women. However, cultural and social factors may influence its impact (such as societal expectations that discourage men from seeking medical check-ups or care, as well as greater access to medical services). Also, given the increasing number of women

smokers and the changing gender norms, the growing participation of women in the labor market—along with increased income and related stressors—could eventually reduce the disparities found in this research, narrowing the gaps in the cost-benefit outcomes. However, more research will be required to corroborate the above. The differences between men and women in their physical and mental responses, and in the ways they respond to economic variables, should be factored into public policy efforts to drive down tobacco use.

Appendix

Table A 1. ANOVA by cluster for the calculation of overall elasticity

Number of observations	9366	R^2	0.7977
Root mean square error	0.38868	Adjusted R^2	0.7338

	Partial sum of squares	Degrees of freedom	Quadratic mean	F-statistic	Prob > F
Model	4240.122	2248	1.8861753	12.49	0
Cluster	4240.122	2248	1.8861753	12.49	0
Residual	1075.1801	7117	0.15107209		
Total	5315.3021	9365	0.56757097		

Table A 2. ANOVA by cluster for the calculation of elasticity for female smokers

Number of observations	4355	R^2	0.8341
Root mean square error	0.429783	Adjusted R^2	0.6785

	Partial sum of squares	Degrees of freedom	Quadratic mean	F-statistic	Prob > F
Model	2086.8443	2107	0.99043392	5.36	0
Cluster	2086.8443	2107	0.99043392	5.36	0
Residual	415.0511	2247	0.18471344		
Total	2501.8954	4354	0.57461997		

Table A 3. ANOVA by cluster for the calculation of elasticity for male smokers

Number of observations	5011	R^2	0.8032
Root mean square error	0.44179	Adjusted R^2	0.6523

	Partial sum of squares	Degrees of freedom	Quadratic mean	F-statistic	Prob > F
Model	2259.0985	2174	1.0391437	5.32	0
Cluster	2259.0985	2174	1.0391437	5.32	0
Residual	553.52537	2836	0.1951782		
Total	2812.6239	5010	0.56140197		

Table A 4. Regression of unit value - Overall

Luvcig	Coefficient	Standard error	T	P>|t|	[95% CI]	
Lexp	.1307624	.0146227	8.94	0.000	.1020976	.1594271
Lhsize	-.0670426	.0385769	-1.74	0.082	-.1426648	.0085795
Sex	-.0078746	.0087275	-0.90	0.367	-.0249831	.009234
Hsize	-.013896	.0102684	-1.35	0.176	-.034025	.0062331
Age	-.0006792	.0003128	-2.17	0.030	-.0012922	-.0000661
Maxedu	.0061091	.0024393	2.50	0.012	.0013274	.0108908
_cons	4.273929	.1485439	28.77	0.000	3.982739	4.56512

Table A 5. Regression of budget share - Overall

Bsvcig	Coefficient	Standard error	T	P>|t|	[95% CI]	
Lexp	-.3067897	.0108389	-28.30	0.000	-.3280372	-.2855422
Lhsize	-.1429862	.0285948	-5.00	0.000	-.1990405	-.086932
Sex	-.0042405	.0064692	-0.66	0.512	-.0169221	.0084411
Hsize	.0051811	.0076113	0.68	0.496	-.0097394	.0201016
Age	.0006014	.0002318	2.59	0.010	.0001469	.0010558
Maxedu	-.0012712	.0018081	-0.70	0.482	-.0048156	.0022732
_cons	3.845376	.1101068	34.92	0.000	3.629534	4.061218

Table A 6. Regression of unit value - Women

Luvcig	Coefficient	Standard error	T	P>|t|	[95% CI]	
Lexp	.1528292	.0266448	5.74	0.000	.1005781	.2050803
Lhsize	-.0851839	.0845236	-1.01	0.314	-.2509366	.0805688
Sex	0	(omitted)				
Hsize	-.0114271	.0198399	-0.58	0.565	-.0503335	.0274793
Age	-.0002764	.0005575	-0.50	0.620	-.0013698	.0008169
Maxedu	.0118352	.0047591	2.49	0.013	.0025026	.0211678
_cons	3.996795	.2714033	14.73	0.000	3.464568	4.529023

Table A 7. Regression of budget share - Women

Bsvcig	Coefficient	Standard error	T	P>|t|	[95% CI]	
Lexp	-.287521	.0181055	-15.88	0.000	-.3230262	-.2520157
Lhsize	-.2388361	.0574348	-4.16	0.000	-.3514669	-.1262053
Sex	0	(omitted)				
Hsize	.0286296	.0134814	2.12	0.034	.0021923	.055067
Age	.0006047	.0003789	1.60	0.111	-.0001382	.0013477
Maxedu	-.0042555	.0032338	-1.32	0.188	-.0105972	.0020861
_cons	3.668316	.1844216	19.89	0.000	3.306661	4.029971

Table A 8. Regression of unit value - Men

Luvcig	Coefficient	Standard error	T	P>|t|	[95% CI]	
Lexp	.106468	.0229554	4.64	0.000	.061457	.1514789
Lhsize	-.0074774	.0582156	-0.13	0.898	-.1216267	.106672
Sex	0	(omitted)				
Hsize	-.0245934	.0162168	-1.52	0.129	-.0563912	.0072045
Age	-.0008487	.0005346	-1.59	0.113	-.0018969	.0001996
Maxedu	.0050222	.0043513	1.15	0.249	-.0035099	.0135544
_cons	4.500775	.2315421	19.44	0.000	4.046767	4.954783

Table A 9. Regression of budget share - Men

Bsvcig	Coefficient	Standard error	T	P>|t|	[95% CI]	
Lexp	-.3159112	.0177561	-17.79	0.000	-.3507274	-.281095
Lhsize	-.0571004	.0450301	-1.27	0.205	-.1453956	.0311947
Sex	0	(omitted)				
Hsize	-.0178581	.0125438	-1.42	0.155	-.0424539	.0067378
Age	.0004345	.0004135	1.05	0.293	-.0003763	.0012453
Maxedu	.0000895	.0033658	0.03	0.979	-.0065101	.0066892
_cons	3.928338	.1790992	21.93	0.000	3.577159	4.279516

Type of elasticity	Reported elasticity	Standard error	Z	P>|z|	[95% CI]
Expenditure – Overall	0.134499	.0623938	2.46	0.014	.0309696 .2755489
Price – Overall	-0.474256	.0070296	-64.16	0.000	-.4648045 -.437249
Expenditure – Women	0.134499	.1029717	1.39	0.164	-.0584201 .3452217
Price – Women	-0.423251	.0003654	248.40	0.000	.0900428 .091475
Expenditure – Men	0.187628	.0929287	1.99	0.047	.0028081 .3670819
Price – Men	-0.539497	.0140706	-40.42	0.000	-.5963002 -.5411446

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