Educational Administration: Theory and Practice
2024, 30(4), 11637 -11644
ISSN: 2148-2403
https://kuey.net/

Research Article

Economic And Social Dynamics Of The Traditional Cigarette Consumption Market In Mexico: 2016-2022

Dr. Gustavo Fabián Pérez-Alvarez*[1] Dr. Jorge Eugenio de Jesús Mora-Tordecillas, [2] Dra. Beatriz Llamas Arechiga[3]

[1*]Universidad Autónoma de Sinaloa Autor de correspondencia, fabian.perez@uas.edu.mx ORCID 0000-0001-9590-7518
[2]Universidad Autónoma de Sinaloa cpjmt@hotmail.com ORCID 0000-0002-6948-829X
[3]Universidad de Sonora llamasabeatrizbla2@gmail.com ORCID 0000-0002-3130-6921

Citation: Dr. Gustavo Fabián Pérez-Alvarez et al. (2024). Economic And Social Dynamics Of The Traditional Cigarette Consumption Market In Mexico: 2016-2022 *Educational Administration: Theory and Practice*, 30(4) 11637 -11644
Doi: 10.53555/kuey.v30i4.11551

ARTICLE INFO

ABSTRACT

This study analyzes the sociodemographic and economic factors that influence the likelihood of smoking in Mexico. The objective was to analyze the key variables affecting tobacco consumption, and the hypothesis posits that factors such as income and geographic location would have a significant effect on the probability of smoking. The methodology employed a quantitative approach with a predictive scope using a probit model, which allowed for the evaluation of the relationship between the variables and the probability of smoking.
The results show that living in urban areas, having higher income, and not having minors in the household increase the probability of smoking. In contrast, factors such as older age, living in rural areas, and the presence of minors reduce this likelihood. Furthermore, the probability of smoking has decreased over time, suggesting a positive impact of anti-tobacco policies

Key words. Economic and social dynamics, market, traditional cigarette

Introduction:

Historically, tobacco consumption in Mexico as in other Latin America countries, have been considering smoking as an acceptable and even appealing activity, especially in certain social sectors. However, the scientific evidence accumulated thought the last decades has revealed the severe and negative effects tobacco has against our health, this situations has been promoting a series of campaigns destinated toward public health and an increase in the regulations to reduce its consumption. Despite these efforts, the results in the decrease of smoking had been limited, which show us not only the evidence of the complexity this phenomenon has, but also the need for an overall approach to board this problem.
According to the national survey of drugs, alcohol and tobacco consumption data (2016), approximately the 17.6% of population (14.9 millions) were active smokers. From those, an 6.4% smoked daily, while 11.1% smoked occasionally. This high prevalence of consumption represents a significate economic weight for Mexican households due to tobacco expenses race against basic needs as education, health and feeding. Families with lower income spend a larger proportion of their budget on the purchase of cigarettes, which increase the risks of perpetuating an addiction cycle, additional medical expenses and loss of productivity. On a global context were cigar use affects around 1,300 million people, the economic and social impact of tobacco remains worrisome, in addition of being one of the main causes of chronic diseases as cancer, cardiovascular and respiratory diseases, which represents a burden on public health systems.
This research is important due to it allows a deep comprehension of the economic and social dynamics which modify tobacco consumption in Mexico. By studying the consumption patterns in varying socioeconomic and demographic groups, this research is looking forward to contribute to the knowledge of consumption of traditional cigarettes and its contribution to the households social and economical well-being. Comprehend the factors that determine tobacco spending will allow the developing of educative and prevention interventions such as fiscal and regulatory measures, as well as fiscal and regulatory adjustments that can have a more direct impact on the health and quality for Mexican citizen's.
The objective of this research is to analyze the social and economical dynamic on the Mexican traditional cigarette market between 2016 and 2022, identifying all the factors that have an influence in the consumption

patterns of the different socioeconomic classes, age groups and gender, evaluating the impact of public health policies and variations on taxes due to tobacco consumption.
The hypothesis maintains aspects such as income, geographic location, gender and life age of the head of the household , study degree, presence of minors and occupational situation significantly influence the probability a person has to become an active smoker.
Comprehend the social and economic dynamics that influence the tobacco market is important to understand the motivations behind the Mexican consumers. Identify the factors that contribute to this expense may help the developing of more specific and effective interventions, from programs dedicated to prevention and education to fiscal and regulatory measures. Besides, this analysis may be useful as a basis to further studies examining other aspects related to tobacco impact on the Mexican society

Theoretical Framework

This study is based on the consumer behavior and economics welfare theories. The consumer behavior theory provides a framework to comprehend the individuals purchasing decisions and the factors affecting them. On the field of tobacco consumption, this theory allows to research the motivations behind the choice of tobacco products, as well as the effect of socioeconomic variables and the effectivity of tobacco control policies. According to Philip Kotler (1996), consumer behavior is fundamental to understand the stimulus-response model, where the environmental stimuli and marketing have an impact on the consumers mind, affecting their process of choices and decisions at the time of making a purchase. This approach is crucial for analyzing the persistence of tobacco in Mexico, despite the fiscal and health increasing restrictions.
External and Internal Influences on Tobacco Consumer Behavior
External Influences. Tobacco use has historically been associated with social rituals and sense of status, which reinforces belonging to certain groups, we translate this as a behavior that aligns with social expectations and perceived norms, as evidenced by Schiffman and Kanuk (2010). The tobacco industry has change in front of the increase of strict regulations. According to Cognodata (2023), a 25% of mexican consumers prioritize the location at the time of purchase, while 24% is looking for lower prices. The accessibility and promotions have an significant influence on the purchasing decisions, especially in urban areas. Internal Influences. The perception of risks is crucial in the purchasing behavior, despite being aware of health risks, many consumers keep smoking due to an attitude that minimizes these risks, said phenomenon can be explain by cognitive dissonance (Festinger, 1957). Following Maslow theory (1943) consumers are looking to satisfy a hierarchy of needs. In the case of tobacco use, the need of belonging or emotional relieve can impulse the consumption, specifically between those who consider smoking as a way to relieve stress.
Consumer Behavior Theory and Responses to Tobacco Control Policies
Consumer behavior theory is also relevant to evaluate the effectiveness of policies as taxes and informative campaign's, despite has been proved that increase the taxes does reduces the consumption in certain areas, it can also receive adaptative responses such as opting for cheaper products or resorting to smuggling (Cruces, 2020). Understanding consumer behavior in Mexico is crucial to design effective policies, the interventions must be adapted to the actual context, cultural and local economic realities. Some strategies that have been already established are: limiting points of sale and increase prices, can be effective , but its crucial to consider the resistance in certain sectors who sees tobacco as an integral part of its social identity, besides, transforming perceptions towards consumption among young people is fundamental for the long-term success of these policies (Pichon-Riviere, 2016). Among Mexican consumer, the purchase preferences present an interesting distribution, where a 25% of Mexican consumers prioritize the store location, incentivizing the importance of the accessibility and convenience, 24% seeks for lower prices and offers, searchinf for the maximum value for their money, 20% value the variety of products, with great interest on being able to decide between multiple options, 18% consider the quality and luxury of the products. In addition, 67% prefer offers distributed between November and December rather than concentrated on a single weekend (Cognodata, 2023).
Wellbeing economics
Wellbeing economics is a branch of economics that evaluates how the allocation of resources and the application of economic policies can influence social wellbeing and maximize society's utility. This theory, based on the efficiency and equality concepts, seeks to ensure that resources are being use in a way were the population wellbeing is maximized and the economic and social disparities get reduced. On the context of tobacco use, the economy of wellbeing examinates the negative effects produced by this habit, not only from a public health perspective, but also in relation with the economic expenses and the impact on the life quality of consumers and their families. The theory maintains that economic policies such as the tax increase over the products that can be noxious for human health, can improve social wellbeing by discouraging harmful practices and increasing tax revenues to fund essential public services, such as medical attention.
Economic Impact of tobacco use
Tobacco use generates significant economical expenses for families, the health system, and society in general. In Mexico, lower income households spend a significant amount of their budget to consume tobacco, which affects in their ability to cover basic needs (health, education and feeding). Nguyen and Nguyen (2020) explain that, eve though households with higher incomes can destinate a higher tobacco expense, the low income households suffer a disproportionate impact on their overall well-being due to the economic burden that tobacco represents on their budgets. Besides, tobacco consumption is associated with chronic diseases such as

cancer, cardiovascular respiratory diseases, which requires expensive and long term medical treatment, damaging not only their families economy but also the stability on the health system. At an macroeconomic level, smoking also affects labor productivity due to the absents causes by the diseases, the decrease life expectancy and health problems related with its consumption. In India, for example, has been demonstrated that tobacco use generates loss of productivity and increases the medical expenses, which affects the long-term economical growth (Sharma, 2023). This situation can be comparable in Mexico, where the cost of treatment expenses caused by diseases related with tobacco use represent an economical burden for the public health system. On a global escalate, the countries with higher smoking rates tends to destinate a significant proportion of their health resources to attend preventable tobacco related diseases, which represents a lost of opportunity in terms of social wellbeing and economical development.

Taxation policies and tobacco control policies

Welfare economics supports the implementation of tax policies over harmful products, such as cigarettes, to reduce consumption and raise funds to improve public wellbeing. Tobacco taxes are an effective economical tool to discourage their consumption, on account of the increase of cost given to the product reducing as a consequence their demand. This theory establish these types of taxes con be progressives, especially in developing countries, where the increase of taxes can have higher consumption-reducing effect on lower-income households. Cruces (2020) found out that in Latin America, tobacco taxes not only generate fiscal incomes but also disproportionately benefit low-income households by reducing their consumption, which translates into lower future medical expenses and a better quality of life. In Mexico, the increase on the tobacco taxes has been a recurring measure to reduce consumption and generate additional resources that can be destinated to public health programs. However , the implementation of these taxes faces multiples challenges, such as the need to establish a tax structure that does not incentivize smuggling or the informal cigarette market, where products tend to be available at lower prices. This situation happens more often in countries as Indonesia, where the contraband of cigarettes increase due to the high taxes, affecting the effectivity on the tobacco control policies (Drope 2021). In Mexico, an appropriated tax structure that reduces access to illegal products can improve the effectiveness of taxes and contribute to a significant reduction in tobacco consumption.

Efficiency and Equity in Tobacco Control

According to the focus of the economics welfare, the tobacco control policies must be efficient and equal. This efficiency implies that tobacco control policies must reduce its consumption and associated costs meaningfully, which implies not only taxes but also the regulations over publicity, the banning of smoking in public spaces and awareness and educational campaign's, as has been shown in the United Kingdom, the tax increase in tobacco next to awareness campaigns has been shown to reduce not only tobacco consumption but also the smoking-related mortality (Ejecutivo 1990). The equality suggest that policies must have in consideration the socioeconomical an cultural differences to avoid that low income households have to address an excessive burden and in that sense, fiscal policies must be accompanied by support programs for smokers who have the desire to quick smoking, especially in the most vulnerable places. The wellbeing economy suggest that the assignation of public resources for rehab and educational programs can reduce de inequalities and improve the results of the tobacco control policies.

Methodology (material and method)

The investigation methods are classified by qualitative and quantitative. Quantitative research is often conceive as large-scale studies with multiple informants or experimental design's which make comparisons, the term quantitative suggest that reality is transform into numbers with the purpose of analyzing and interpreting it (Taylor & Bogdan, 1987).

This research uses a quantitative approach allowing a systematic and precise analysis of tobacco consumption in Mexico between 2016 and 2022. According to Hernandez Sampieri Fernández-Collado y Baptista Lucio (2014, this approach is centered on the recollection and analysis of numeric data to identify patterns and establish relations between variants. It is particularly suitable to examine the correlations between tobacco consumption and sociodemographic factors, such as, age, gender, educational level and incomes, without manipulating the variables, which implies a non-experimental, cross-sectional and correlational design.

The scope of the study is descriptive-correlational. This type of study allows exploring the relationships between two or more variables in a specific context, being useful to describe patterns of tobacco consumption and its relationship with sociodemographic and economic factors in Mexico (Robson, 2002). Furthermore, a predictive component is incorporated through a "Probit model" to estimate the probability an individual has to be an smoker according to various explanatory variables. This approach combines the description of the characteristics of the smoking population with the capacity to predict their behavior, fulfilling the objectives of the research.

For the analysis, STATA, the statistical software will be used, which is know for its effectiveness in econometric studies thanks to its capacity to realize descriptive analysis and advance models. Long an Freese (2016) highlight that STATA allows to realize regression models, as the probit model, ideal to analyze dichotomous variables such as the active smoker status. The predictive model (Probit), will be apply to predict the probability of being a smoker based en several explanatory variables. Long (1997) points out these models are appropriate for dependent binary variables as smoking or not smoking since they allow estimating probabilities and

comprehend the precise influence of the explanatory factors. In this study, the dependent variable will be binary: smoker (1) or non smoker (0), meanwhile the explanatory variables will include sociodemographic factors such as age, gender, socioeconomic level and income.

The secondary data will be obtain from official sources as the national household expenditure and income survey (2022), and other national studies that provide detailed information on consumer behavior in Mexico. The apply of this secondary data is common in quantitative studies because it allows the access to an extensive and representative broad (Hernández Sampieri et al., 2014).

To develop the analysis and build the predictive model, these steps will be followed:

• Database. The data will be imported and processed in STATA following the cleaning and debugging recommendations proposed by (Wooldridge, 2010). This process includes the treatment of missing values, creation of dichotomous variables and coding of categories as socioeconomic level or gender to ensure the quality and consistency of the data.

• Descriptive Analysis. A descriptive analysis of the variables will be performed, including frequency and distribution, to identify general patterns in tobacco consumption. According to Bryman and Bell (2011), this type of analysis helps to better understand the characteristics of the sample and its relationship with the relevant variables, facilitating the subsequent interpretation in the probit model.

The probit model estimation. After the descriptive analysis, we will proceed to estimate the probit model with the following specification:

- Model: $P(Y=1|X) = \Phi(\beta 0+\beta 1age+\beta 2Gender+\beta 3socioeconomiclevel+\beta 4Income+\beta 5Educatio´n+...)$

Here the letter "Y" is used to represent the dependent variable (smoker= 1; non smoker=0) while the letter "X" indicates the vector of independent variables. Wooldrige (2010) marks out the probit model as extremely useful to analyze the binary probabilities depending on several predictors.

• Model evaluation, This model will be evaluated thought measures as "Pseudo-R^2" and the right rating rate, by using the criteria proposed by Long and Freese (2006). For each independent variable, significant tests will be make with the purpose of evaluating its contribution to the probability of being a smoker.

• Interpretation of the results. The probit model coefficients will be interpretated according to their respective effects over the probability of being a smoker. This will allow the identification of sociodemographic and economic characteristics that significantly influence tobacco consumption in Mexico. . Hernández Sampieri et al. (2014) emphasize the importance of interpretating the aligned results with the objectives and the study hypotheses which is crucial to develop relevant conclusions and policy recommendations.

Outcomes and Discussion

Hereunder are the results of the tobacco expenditure per family in Mexico analysis thought the years 2016, 2018, 2020 and 2022. The data is segmented in five income levels (Quintiles), representing the different socioeconomic groups showing the expenses in millions of Mexican pesos per each income level. This analysis allows the observation of how tobacco consumption has varied in terms of expenditure in each group thought those years, which is fundamental to comprehend the economic impact tobacco consumption has in different sectors of the population. Next, a series of tables with the obtained results:

Table 1. monthly expense of cigarettes in Mexican households according to their income level

Income level	2016	2018	2020	2022	Total
1	67,654,985.15	53,080,470.17	63,322,407.50	77,199,369.75	261,257,232.56
2	63,571,556.37	84,712,978.71	59,089,131.60	68,635,504.22	276,009,170.90
3	91,189,189.71	86,273,937.76	78,236,851.09	80,410,711.84	336,110,690.40
4	106,553,909.65	111,269,077.95	84,062,588.52	100,837,787.54	402,723,363.66
5	152,643,349.59	155,941,006.84	130,175,767.71	153,187,229.54	591,947,353.67
Total	481,612,990.47	491,277,471.43	414,886,746.41	480,270,602.88	1,868,047,811.19

Source: **own development based on ENIGH's from period 2016 to 2022**

The table demonstrates data about the total expenditure on tobacco distributed between five levels of income, revealing a mild upward tendency over time. The expenditure reach its maximum peak in 2018 with $491,277,471.43 and remained lifted in 2020 with $480,270,602.88 after experience a decline in 2020.This is overlaps with Fernandez (2021), who mentions that this reduction may be linked with the COVID-19 pandemic, said event affected the economy as the consumption habits, leading the consumers to reduce their expenses on non-essential products and facing them the challenge of not being able to reach them during confinement.

Level 5 (highest income) showed the highest accumulative expenditure on tobacco thought the four analyzed years, totalizing $591,947,353.67, which is significant, indicating that this habit is common among different population sectors. This result agrees with a study elaborated by Nguyen & Nugyen (2020), suggesting that households with higer incomes tend to spend more money on tobacco, its observed that middle levels (levels 3 y 4) maintain a constant and significant expenditure on tobacco.

In 2018, all income levels except level 1 experience an increase in comparison to 2016. Level 2 showed a notable increase that year; this may be attributed to advertising campaigns or higher accessibility to the product, on the other side in 2020, a decrease on cigarette spending at all levels is reflected, this can be contributed to external factors such as the pandemic and the downturn in the country's economy, this matches with an study made by (Cognodata, 2023) who expresses how the process of buyers distribution is made by being based on the different acquisition factors a product has. Despite this drop, level 5 kept showing the highest accumulated expenditure, suggesting an inelasticity of consumption between the richest households in accordance with the economic welfare theory on regard to addictive products (Sharma, 2023).

Table 1 shows the economic burden of tobacco consumption and how it varies according to different income levels. However, those with higher incomes spend more in absolute terms, those with low and middle incomes spend a greater proportion on this product, thus affecting their economic well-being. This finding is consistent with the work of Cruces (2020), who argues that households with lower incomes are more vulnerable to the economic consequences derived from consumption due to the significant proportion that this expense represents within their budget.

Considering the results from table 1 and the perspective of the consumer behavior theory it is evident that the expenditure patterns are influence by factors such as income and macro economic conditions, which is similar with the point out by Kotler (1996) about how the consumer characteristics and stimuli affect purchase decisions. In Mexico, the location and accessibility on a sale point along with promotional campaigns can significantly influence the spending among middle levels.

Table 1 shows the economic burden of tobacco consumption and how it varies according to different income levels. However, those with higher incomes are also the ones who spend more in absolute terms while those who have lower and medium incomes destinate a higher proportion to this product affecting their economic wellbeing. This discovery has coherence with the work made by Cruces (2020), who maintains that households with lower incomes are way more vulnerable toward the economic consequences made by the consumption due to the significant proportion represented by this expenditure inside their budget.

Thanks to the observation made thought the year 2020 the decline in spending can be interpreted as a response to external factors and not a real smoking habit reduction. This phenomenon sticks with the idea of Fernandez (2021), who mentions that consumption can be sensible to certain economic or social events; seeming to be that the pandemic may have had temporally altered the consumption habits by modifying the social and economic context.

Table 2. Monthly expenditure on cigarettes Mexican families made by quintiles of income level and geographic location

Location	Income level	**2016**	**2018**	**2020**	**2022**	**Total**
Urban	1	49,361,279.54	34,519,452.13	47,803,953.10	60,549,358.93	192,234,043.69
Urban	2	49,412,800.94	68,798,922.93	45,656,060.88	57,145,163.72	221,012,948.47
Urban	3	77,497,496.54	74,501,133.95	66,774,300.49	67,966,851.53	286,739,782.51
Urban	4	95,987,863.37	99,858,805.88	70,271,718.01	90,135,233.52	356,253,620.77
Urban	5	146,967,800.75	144,974,726.32	121,072,689.47	140,991,288.05	554,006,504.60
Urban	Total	419,227,241.14	422,653,041.21	351,578,721.95	416,787,895.75	1,610,246,900.04
Rural	1	18,293,705.61	18,561,018.04	15,518,454.40	16,650,010.82	69,023,188.87
Rural	2	14,158,755.44	15,914,055.78	13,433,070.72	11,490,340.49	54,996,222.43
Rural	3	13,691,693.17	11,772,803.82	11,462,550.59	12,443,860.31	49,370,907.89
Rural	4	10,566,046.28	11,410,272.07	13,790,870.51	10,702,554.02	46,469,742.88
Rural	5	5,675,548.83	10,966,280.52	9,103,078.24	12,195,941.49	37,940,849.07
Rural	Total	62,385,749.33	68,624,430.23	63,308,024.46	63,482,707.13	257,800,911.14

Source: **own development based on ENIGH's from period 2016 to 2022**

Table 2 indicates significant differences of tobacco consumption expenditure between rural and urban areas. The urban zones report a total expenditure of $1,610,246,900.04 million pesos, while rural zones only reach $257,800,911.14 million during the same period. This discrepancy is due to the higher accessibility and availability of tobacco products inside the cities and a bigger proportion of incomes for consumption. This matches with Schiffman & Kanuk (2010), they mentioned that urban environments usually offer more advertising stimuli and access to points of sale, these elements can increase the consumption.

In urban areas, the highest income levels (4 y 5) present the higher accumulated expenditure on tobacco with a total of de $910,260,125.37 millions during the four analyzed years. On the other side, in rural areas, the higher level (5) shows a much lower accumulated expenditure: : $37,940,849.07 millions. This suggest that

tobacco represents a lower proportion on the total expenditure on these areas due to budgetary constraints and less exposition to consumerist stimuli; this idea is supported by Kotler (1996).
The spending in rural areas is mostly focused on the lower levels (1 y 2), who accumulated $124,019,411.30 millions. This pattern has coherence with the work of Nguyen & Nguyen (2020), supporting the idea that households with lower incomes usually destinates a higher proportion of their budget to addictive products as tobacco; this has a negative impact on their economic and social wellbeing.
In 2020 a generalized fall over the total expenditure due to tobacco can be observed in urban zones just as much as rural zones: from $422,653,041.21 in 2018 to $351,578,721.95 in 2020 for urban zones; meanwhile in rural zones the decrease went from $68,624,430.23 to $63,308,024.46. This fits with Fernández (2021) who said this reduction could be related with the COVID-19 pandemic which affected the available incomes and limited the access to products due to the sanitary measures.

Table 3. The expenditure consumption of cigarette in families by the sex of the head of household and income level.

Gender	Income level	**2016**	**2018**	**2020**	**2022**	**Total**
men	1	54,960,119.96	44,539,336.62	52,339,347.70	63,120,204.78	214,959,009.07
men	2	50,824,659.64	60,413,072.97	48,818,332.87	50,487,523.82	210,543,589.29
men	3	77,293,130.49	65,782,512.33	62,759,433.50	63,253,519.53	269,088,595.85
men	4	84,706,085.11	81,804,670.78	64,967,559.43	75,666,832.08	307,145,147.40
men	5	108,706,415.55	110,044,830.47	99,974,696.95	109,346,941.72	428,072,884.69
men	Total	376,490,410.74	362,584,423.17	328,859,370.46	361,875,021.93	1,429,809,226.30
woman	1	12,694,865.18	8,541,133.55	10,983,059.79	14,079,164.96	46,298,223.49
woman	2	12,746,896.74	24,299,905.74	10,270,798.73	18,147,980.40	65,465,581.61
woman	3	13,896,059.22	20,491,425.44	15,477,417.58	17,157,192.31	67,022,094.55
woman	4	21,847,824.54	29,464,407.17	19,095,029.09	25,170,955.46	95,578,216.26
woman	5	43,936,934.04	45,896,176.37	30,201,070.75	43,840,287.82	163,874,468.98
woman	Total	105,122,579.73	128,693,048.27	86,027,375.94	118,395,580.95	438,238,584.89

Source: **own development based on ENIGH's from period 2016 to 2022**

The table shows the marked differences in tobacco spending by heads of households between men's and women. Men's accumulated a total expenditure of $1,429,809,226.30 million in front of $438,238,584.89 million spent by woman across the analyzed period. This finding supports Kotler (1996), who suggest that social and cultural influences have a significant impact on the purchasing decisions according to its gender; historically, smoking has been more common among men's.
If we analyzed by income levels, we can observed that men's as heads of households in the highest level (level 5) have the highest accumulative expenditure on tobacco with a total of $428,072,884.69 million; while females head of household from that same level only spent $163,874,468.98 million. The difference between all level genders is evident, but they get reduce on lower levels (level 1).
In terms of timing, both genders showed a spending downfall in 2020. Men's decreased their spending from $362,584,423.17 million in 2018 to $328,859,370.46 million. This tendency is related with the negative impact of the COVID-19 pandemic about incomes and consumer behavior by prioritizing the consumption of essential products (Fernández, 2021).
Probit Model Results
The probit regression model presented has smoking as the dependent variable, which indicates that the probability of smoking is based on function of diverse sociodemographic and economic characteristics. Here under the results of the estimated coefficients are set, along with theirs standard error, z-value, p-value and 95% trustworthy intervals.

Table 4. Results of the Probit Model on the probability of smoking based on the sociodemographic and economic variables.

Variable	**Coefficient**	**Standard Error**	**z**	**P > |z|**	**trustworthy interval (95%)**
Rural	-0.5179793	0.0011333	-457.07	0	[-0.5202004, -0.5157581]
Sex_headofhousehold	-0.360777	0.0013039	-276.68	0	[-0.3633327, -0.3582213]

age_ headofhousehold	-0.1438739	0.0007142	-201.46	0	[-0.1452736, -0.1424742]
Edu_ headofhousehold	0.0177639	0.0005351	33.2	0	[0.0167151, 0.0188127]
Minors1	-0.1535768	0.0010062	-152.62	0	[-0.155549, -0.1516046]
Women1	-0.5923729	0.0013296	-445.53	0	[-0.5949789, -0.589767]
Ing_mon	8.37E-07	1.13E-08	74.14	0	[8.15E-07, 8.59E-07]
Perc_ocupa	0.225642	0.0004354	518.18	0	[0.2247885, 0.2264954]
Year	-0.0300654	0.0001734	-173.41	0	[-0.0304052, -0.0297256]
Unimul	-0.2498368	0.0012319	-202.8	0	[-0.2522514, -0.2474223]
Toti	-0.0403077	0.0009689	-41.6	0	[-0.0422067, -0.0384086]
_cons	59.72335	0.3499621	170.66	0	[59.03743, 60.40926]

Source: own development.

The negative coefficient (-0.361) for the gender of the household head indicates that, if the head is a men, the probability of smoking is lower. This can reflect differences on the consumption patterns between genders and a higher prevalence of smoking among men who are not heads of household.
Households head age has a negative effect (-0.144), suggestion that the older he is, the probability of smoking is lower. On the other side, the educational level (0.018) has a positive effect, pointing that higher educational level is associated with a higher probability of smoking, this may be possible due to the different attitudes toward tobacco. This supports the idea of Sharma (2023), where it lays the idea the consequences of smoking on productivity is given due to absences derived from the health of consumers.
The variable "minors 1" has a nonpositive coefficient (-0.154), indicating that having minors at home reduces the probability of smoking, aligning with Kotler's (1996) theory, where the family health concerns have an influence in their consumption habits.
The positive coefficient (8.37E-07) suggest that an increase on the monthly income is associated with a higher probability of smoking, although this effect is slight. This support Cruces (2020) idea pointing that people with higher resources may be willing to spend on nonessential products as tobacco is.
The variable "pere_ocupa" presents a significant positive coefficient (0.226), pointing that a higher percentage of household occupation can increase the possibility of smoking, probably related with the labor stress as a factor associated with smoking.
The negative coefficient for the variable "year" (-0.030) suggest a decrease in the probability of smoking over the time, which may reflect the positive impact of the recent anti-smoking policies and informative campaigns.
The variables "unimul" (-0.250) and "toti"(-0.040) also show significant negative effects, pointing that aspects related with the family structure and household size may have an influence on the probability of smoking.

Conclusions

The purpose of this research was to examine the sociodemographic and economic factors that affect the probability of smoking in Mexico and seeing how these variables influence the consumption behavior towards tobacco. Through a descriptive statistical analysis and a probit model, relevant factors such as place of residence (rural or urban), gender and age of the head of household, educational level, presence of minors, monetary income and percentage of occupation were identified. The results confirmed that these variables have a significant impact on tobacco consumption, achieving the stated objective.
The initial hypothesis held that aspects such as income, geographic location, gender and age of the head of household, educational level, presence of minors and occupation significantly influence the probability of smoking. The results obtained support this hypothesis by showing that living in urban areas and counting with higher incomes increase the probability of smoking.
Among the most relevant findings, it is highlighted that residing in urban areas increases the probability of smoking due to higher accessibility to products and advertising. Besides, it was observed that, if the head of the household is a man, this reduces the probability of smoking. Age has a negative effect on smoking, while a higher level of education slightly increases it. The presence of children at home significantly decreases the probability of smoking due to family responsibilities.
A higher monthly income and a higher percentage of occupation are related to an increase in the probability of smoking. The temporal variable indicates that the probability has decreased over time, probably due to more effective anti-smoking policies.

Several recommendations are proposed: reinforce anti-smoking policies in urban areas through taxes and advertising restrictions; carry out educational campaigns on the risks of smoking for children; establish educational programs aimed at young people to reduce their consumption; and carry out continuous evaluations of anti-smoking policies to ensure their effectiveness.

Acknowledgements:
I wish to express my deepest gratitude to all those who have participated on the execution of this research work. Firstly, to the support group, Ana Elena Villaseñor and Jovani Armenta for their dedication and great commitment to the construction of this work, and to my colleagues from the academic group Dr. Jorge Eugenio de Jesús Mora Tordecillas y la Dra. Beatriz Llamas Arechiga for their valuable contribution to this article.

References:

1. A., R. (2004). *Economic costs of smoking in Brazil*. Brazilian Journal of Public Health, 30(4), 573–583.
2. Bryman, A., & Bell, E. (2011). *Business research methods* (3rd ed.). Oxford University Press.
3. Cognodata. (2023). *Informe sobre tendencias de consumo en México*. Cognodata Insights.
4. Cruces, G. (2020). *The progressive impact of tobacco taxes on low-income households*. Latin American Public Finance Review*, 15*(3), 225–242.
5. Drope, J. (2021). *Impact of cigarette tax structures on consumption and government revenues in Indonesia*. Tobacco Control and Policy, 12(2), 311–326.
6. Ejecutivo, D. (1990). *Fiscal policies and tobacco consumption reduction: A review of the UK's tax impact on public health*. British Public Health Journal, 22(1), 65–79.
7. ENIGH (2022). *Resultados de la Encuesta Nacional de Ingresos y Gastos por Hogar*. https://www.inegi.org.mx/
8. ENCODAT. (2016). *Reporte de Consumo de Drogas*. Buelna Onda editores.
9. Fernández, L. (2021). Efectos de la pandemia en el consumo de productos no esenciales: Un análisis de tendencias. *Journal of Economic Behavior, 12*(3), 45-63.
10. Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford University Press.
11. Hernández Sampieri, R., Fernández-Collado, C., & Baptista Lucio, P. (2014). *Metodología de la investigación* (6ª ed.). McGraw-Hill.
12. Huang, X. (2023). *Socioeconomic inequalities in tobacco consumption in China: Policy impacts and outcomes*. Asian Health and Economic Review, 18(4), 375–391.
13. Kotler, P. (1996). *Marketing management: Analysis, planning, implementation, and control* (9th ed.). Prentice Hall.
14. Long, J. S. (1997). *Regression models for categorical and limited dependent variables*. Sage.
15. Long, J. S., & Freese, J. (2006). *Regression models for categorical dependent variables using STATA* (2nd ed.). STATA Press.
16. NBER. (2023). *Tax policies and youth tobacco consumption: Effects of e-cigarette taxation*. National Bureau of Economic Research.
17. Nguyen, M., & Nguyen, L. (2020). Socioeconomic disparities in tobacco expenditures and health outcomes in low-income households. *Journal of Economic Health Research, 14*(2), 85–104.
18. Maslow, A. H. (1943). *A theory of human motivation. Psychological Review*, 50(4), 370–396.
19. Pichon-Riviere, A. (2016). *Economic burden of smoking-related diseases in Brazil*. Brazilian Health Economics Journal, 9(3), 245–260.
20. Pinilla Domínguez, M. (2015). *Impact of cigarette tax structures on consumption in the EU*. European Journal of Health Economics, 21(5), 610–622.
21. Robson, C. (2002). *Real world research: A resource for social scientists and practitioner-researchers* (2nd ed.). Blackwell.
22. Schiffman, L., & Kanuk, L. (2010). *Consumer behavior* (10th ed.). Pearson Education.
23. Sharma, A. (2023). *The economic impact of tobacco consumption in India: Health costs and productivity loss*. Journal of Health Economics in Developing Countries, 11(1), 58–74.
24. Taylor, S., & Bogdan, R. (1987). Introduccion a los metodos cualitativos de investigacion. PAIDOS: España.
25. Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data* (2nd ed.). MIT Press.
26. Yurekli, A. (2004). *Diseño y Administración de los Impuestos al Tabaco:* Herramientas 4: Impuestos. Serie de Herramientas sobre Economía del Tabaco;