

# Tobacco Tax in Mexico and Fiscal Federalism

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## Abstract

### Background

The Mexican economy is fiscally centralized, in particular since the enactment of the Fiscal Coordination Law (LCF) in 1980, which abolished over 400 state taxes and a number of excise taxes. As a result, tax levied by states and municipalities accounts for no more than 10 percent of the full amount they receive in revenue. Subnational governments in Mexico could play a more active role, either by introducing new taxes or by applying existing but as yet unused taxes, such as a 4.5-percent state tax on the sale of tobacco products. The objective of this research is to estimate the effects that a hypothetical subnational tax reform on tobacco products would have on consumption, revenue, and poverty levels.

### Methodology

Based on three local and federal tobacco tax increase scenarios, this study uses a microsimulation model, MEXMOD, which accounts for the tax-benefit system at a household level including tobacco price elasticities to explore the effects of a 4.5 percent state-level tobacco tax on consumption, revenue, and poverty in the states of Mexico. In terms of fiscal federalism, we examine each state's contribution and the share of revenue it receives from the federation, considering elasticities by socioeconomic status and each state's pattern of consumption. The paper concludes by presenting a scenario whereby the increase in revenue is distributed between states in order to strengthen social programs.

### Results

A reform introducing an additional 4.5-percent *ad valorem* state tax results in a decrease in consumption in states with the highest levels of poverty and chronic poverty, such as Chiapas, Hidalgo, Guerrero, Oaxaca, and Tlaxcala, due to the combined effect of both taxes. However, the decrease in consumption is less pronounced in states with lower levels of chronic poverty (Jalisco, State of Mexico, Mexico City, and Nuevo León). Meanwhile, the amount of revenue generated is marginal, but does become significant in the four states with the largest economies and populations (State of Mexico, Mexico City, Nuevo León, and Jalisco). Beyond the additional state revenue available, the new reform does not alter the tax structure or position of the states. Lastly, the 4.5-percent *ad valorem* tax reform has no impact on poverty, and in conjunction with the revenue distributed to states (5.65 billion pesos) from federal tax, would enable a 71-percent increase in the number of beneficiaries of a program for individuals with disabilities.

## Conclusions

A greater decrease in consumption would be achieved in poorer states than in wealthier states, and an increase in the federal specific tax of one peso per cigarette leads to a decrease in consumption of over 40 percent in 4 states, over 30 percent in 20 states, and up to 30 percent in eight states. A subnational tax of 4.5 percent would generate an additional 885 million pesos on top of federal revenue and would not cause an increase in poverty.

**JEL Codes:** H22 · H51 · H77 · H71 · H72

**Keywords:** Tobacco, specific tax, federalism, tax revenue, expenditure

## Introduction

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The smoking epidemic lingers on in Mexico. A report using the ENSANUT (2021) describes how smoking prevalence has increased among adolescents and women. Although Mexico has stepped up its efforts to combat tobacco use after signing the Framework Convention on Tobacco Control (FCTC), more action is needed to further promote increases in excise taxes on cigarettes and reduce consumption more effectively.

According to a report by the World Health Organization (WHO), in 2020 indirect taxes accounted for 67.6 percent of the final retail price of a pack of the best-selling brand of cigarettes in Mexico (WHO, 2021). This is below the 75-percent threshold recommended by the WHO. Other countries in the Americas have made greater progress and, in some cases, exceeded the minimum percentage recommended by the WHO, notably Argentina (76.6 percent), Brazil (81.5 percent), Chile (80 percent), Colombia (73.1 percent), and Venezuela (73.4 percent).

While excise taxes on tobacco are the most cost-effective strategy to reduce consumption, most effective of all are reforms aimed at increasing the specific component of excise taxes (Chaloupka et al., 2021). Mexico introduced a specific component of excise tax in 2010, which was set at 0.35 pesos per stick in 2011 and then, from 2020 onwards, adjusted for inflation.

Consequently, in a country with as diverse a geography and population as Mexico, where levels of human and economic development differ substantially among states and regions, it is necessary to conduct an analysis of potential local tobacco tax revenue to support a public policy able to address the different needs of each region or state. This diversity is reflected in broad differences in tobacco-related morbidity and mortality and in health care coverage, which in turn is a reflection of differences in income and formal employment levels, resulting in unequal access to a highly fragmented and restricted system of social protection, which includes a component of health.

In parallel, in recent years there have been a number of different reform initiatives submitted to the Congress of the Union to further promote an increase in cigarette excise tax, but the policy of the current administration is not to increase federal taxes.

It is therefore appropriate for subnational governments in Mexico to play a more active role such as the recent case of Tamaulipas in 2020 which imposed an ad-valorem tax of 4.5 percent, either through new taxes or existing but as yet unused ones, as is the case with a hypothetical tax rate of 4.5 percent on tobacco sales, which is allowed and currently provided by the Fiscal Coordination Law (LCF). Given that states have taxation rights to certain goods and services such as alcohol, sugary drinks and tobacco up to a rate of 4.5%, this research examines the effect that a subnational excise tax on cigarettes would have on consumption, revenue, and poverty. To this end, we propose different reform scenarios which are legally viable and feasible by calculating the impact of these initiatives on outcomes of interest at the national and subnational levels, taking into account the price elasticity of demand for tobacco by tercile calculated by Huesca et al. (2020). In terms of fiscal federalism, we examine each state's contribution to national revenue and the share of revenue it receives from the federation.

## Review of literature

The Mexican economy is fiscally centralized, in particular since the enactment of the Fiscal Coordination Law (LCF) in 1980, which abolished over 400 state taxes and a number of excise taxes (Amieva-Huerta, 2002). This legal framework, among other factors, explains the meager revenue collected directly by states and municipalities, accounting for barely 10 percent of all public income (Jiménez & Ter-Minassian, 2016).

In a federal country like Mexico, a greater use of subnational taxes is not only justifiable and supported from a legal standpoint, but also from a perspective of co-responsibility between states in terms of public income and expenditure. The introduction of such a tax is also justified by the different levels of development and social needs between states. Different levels of prevalence in the general population or by age group between states result in differences in smoking-associated costs, just as differences in income and price sensitivity affect consumption and lead to substantial differences in tobacco tax revenue. This diversity calls for an understanding of the distributional effects of new tax rates or the application of tax rates already provided for in the LCF but as yet unused.

A recent study by Sáenz de Miera et al. (2022) in Mexico explores the regional effects of a 1-peso increase in the specific component of the federal cigarette excise tax (IEPS) on smoking prevalence, revenue, the costs of smoking-related diseases, and catastrophic expenditure averted due to lower levels of morbidity and mortality and the impact this has on poverty. By dividing the country into five regions defined by geographical, epidemiological, and economic criteria, their research finds that these regions strengthen

or weaken to some degree the effect of an excise tax. They report that prevalence is higher in the Northwest, at 18 percent of individuals ten years or older, while the Central region has the highest number of smokers, with 36 percent of all smokers, and the greatest proportion of impoverished smokers is found in the South, where 60 percent of smokers are from the bottom two income quintiles. Following a one-peso increase in the specific tax component, it was estimated that 1.5 million smokers would quit across all regions. Although on average cessation in the first (poorest) quintile is three times greater than in the richest quintile, in the South, cessation in the first quintile would be 19 times that of the last quintile. Meanwhile, the Central and West regions of Mexico would account for 58 percent of the additional revenue generated by the tax increase. It was further estimated that this tax would allow half a million individuals to avoid catastrophic health expenditure due to tobacco-related diseases, half of whom are from the two lowest income quintiles.

Theory and empirical evidence point to the importance of coordination between subnational and federal tax authorities in applying local taxes. A good example is the United States, where local governments began implementing excise tax on tobacco over a century ago. The state of Iowa was first to introduce excise tax in 1921 for the purposes of generating revenue. Within a few years, great disparities existed between local systems of tobacco tax introduced by subnational governments, which compromised the original objectives, notably that of discouraging consumption. The early 1980s saw the beginning of a considerable increase in tobacco tax rates and amounts, along with broad differences in levels of taxation among local governments. To give just one example, in 2010, state tax on a pack of cigarettes ranged from US\$ 0.07 in South Carolina to as much as US\$ 3.47 in Rhode Island (De Cicca, Kenkel, & Liu, 2010).

A study conducted by De Cicca, Kenkel, and Liu (2010) cites these differences in tax rates among states and local governments as one factor driving tobacco excise tax avoidance. By surveying tobacco purchasers, the authors found that at least 5 percent of smokers buy tobacco outside of their state of residence; crossing state or international borders to purchase tobacco has thus become a form of tax avoidance. The study reported that in 2003, in at least 20 U.S. states, taxes were on average 20 percent less than the optimal Pigouvian tax, defined as the necessary level of tax to offset the negative externalities arising from the social costs associated with tobacco-related diseases.

Also found were distortions in the tax burden or over-shifting of the full amount of tax plus a premium to consumers in areas bordering states where prices were even higher, according to Hanson and Sullivan (2009).

One possible way to eliminate tax inefficiencies resulting from a heterogeneity of taxation levels between states is for a federal authority to impose a minimum price. Doogan et al. (2017) simulate different minimum cigarette pack price scenarios, ranging from US\$ 4 to US\$ 10. The authors find that the variation in prices between different brands decreases

as the mandatory minimum price increases, up to the maximum price scenario. Thus, the higher the minimum price, the less margin there is for the tobacco industry to offer discounted prices to different sectors of the population, particularly adolescents, seniors or lower-income consumers. This demonstrates the importance of fiscal coordination among subnational governments to prevent distortions or the establishment of suboptimal taxes that affect the expected revenue and undermine the desired effects on tobacco consumption.

One of the challenges of tax harmonization is aligning the interests, objectives, and patterns of consumption of subnational governments and societies. To achieve proper fiscal coordination and minimum optimal results for all parties involved, it is crucial to have in place country-level institutions with decision-making powers that are not biased toward the interests or needs of certain subnational governments (Blecher & Drope, 2015).

## Tobacco taxes in Mexico

The Excise Tax on Production and Services (IEPS) was introduced in Mexico in 1981 under the corresponding tobacco law, which initially imposed a general rate of 139.3 percent, supplemented by a rate known as the “mainstream filtered cigarette rate” and set at 20.9 percent. From 1986 to 1988, the rate was 180 percent, with a mainstream unfiltered cigarette rate of 25 percent; from 1989 to 1990, the rate dropped to 160 percent, with the rate for mainstream unfiltered cigarettes at 20.9 percent; from 1991 to 1994 the rate fell to 140 percent; from 1995 to 1999, the rate was further reduced to 85 percent; and from 2000 to 2005, the rate was raised from 100 percent to 110 percent, as was the rate for low-cost cigarettes, which rose from 20.9 percent until it came into line with the general rate of 110 percent. In 2007, the rate increased to 140 percent. The mainstream unfiltered cigarette rate was eliminated in fiscal year 2008, when a general rate of 150 percent was established in Transitional Article 3. In fiscal year 2010, the general IEPS rate was 160 percent, supplemented by a specific tax of 0.04 pesos per cigarette. From 2010 to 2021, the general IEPS rate was maintained at 160 percent, while the specific tax per cigarette increased from 0.04 to 0.35 pesos in 2011 and remained at that level until 2019. In fiscal year 2020, the specific tax was raised to 0.4944 pesos in the published Decision Updating the Specified Fees for the Excise Tax on Production and Services (*“Acuerdo por el que se actualizan las cuotas que se especifican en materia del impuesto especial sobre producción y servicios”*). In fiscal year 2021, the specific tax was 0.5108 pesos (DOF [Official Gazette of the Federation], multiple years).

Tobacco is also subject to value-added tax (VAT) at 16 percent, or eight percent in northern border municipalities, under the Decree on Fiscal Stimuli in the Northern Border Region (DOF, 2018).



In 2011 a nominal increase in revenue of 12.69 percent was observed with respect to 2010, when the specific component was raised from 0.04 pesos to 0.35 pesos. However, in 2012, the increase stood at just 10.16 percent, and from 2013 to 2018 ranged from 0.94 to 6.86 percent. In fiscal year 2020, when the specific component was updated from 0.35 pesos to 0.4944 pesos, revenue increased by 3.21 percent. Despite this, as a share of GDP there was no change in revenue, which remained at 0.20 percent of GDP (DOF, 2019; SHCP, 2022).

Exceptionally, the state of Tamaulipas did reform its state laws on excise tax on tobacco use in 2019 (coming into effect in 2020), introducing a state *ad valorem* tax of 4.5 percent before VAT, based on the state fiscal powers set forth in the LCF.

- ***Fiscal federalism***

In Mexico, the National Fiscal Coordination System (SNCF) provides the basis under which states share in federal tax revenue. All states have entered into agreements binding them to the SNCF, under which they relinquish their fiscal powers to the Federation in exchange for a share of federal tax revenue (such as income tax and value-added tax).

The share of IEPS revenue that goes to states differs depending on the type of good. In the case of beer, soft drinks, alcohol, and other fermented beverages, it is 20 percent, whereas for manufactured tobacco, states receive eight percent. In addition, these non-earmarked funds are assigned to each state in proportion to state sales of each good as a share of the national total. In other words, eight percent of national revenue from prepared tobacco is assigned in the form of non-earmarked transfers to the 32 states altogether, and this eight percent is, in turn, distributed to each state in accordance with the state's relative contribution to total revenue, meaning that each state will receive a different share of revenue. Table 1 shows the share of revenue payable to states in 2021. In addition to the states' eight percent share of IEPS, under the Fiscal Coordination Law, another 20.6 percent of this federal revenue is assigned as non-earmarked transfers (known as *recaudación federal participable*, RFP) and distributed as follows: 18.4 percent through the General Fund for Non-Earmarked Transfers (*Fondo General de Participaciones*); 0.1251 percent through the fund for border or coastal municipalities; 1.15 percent through the Oversight and Collection Fund (*Fondo de Fiscalización y Recaudación*); and 0.92 percent through the Municipal Promotion Fund (*Fondo de Fomento Municipal*). This study only considers revenue from the eight percent assignable to states; our results do not therefore include the 20.6 percent allocated to the funds listed above. None of these funds, known as *fondos participables*, is earmarked for tobacco control.

Notable is the fact that the most densely populated states receive a greater proportion of federal revenue (Table 1). Such is the case of the State of Mexico (*Estado de México* or *EdoMéx*), Mexico City (*Ciudad de México* or *CDMX*), Jalisco, and Nuevo León, which receive 19.2 percent, 10.74 percent, 8.98 percent, and 7.74 percent respectively. They are followed by another no less important group of states comprising Coahuila, Querétaro, Puebla, Chihuahua, Michoacán, and Baja California, which receive between 3 and 4.3 percent. The remaining states receive an average of 2 percent, with shares ranging from 0.15 percent in Campeche to 2.91 percent in the state of Sonora. The factors used to adjust the distribution of revenue remained similar from 2020 (not shown in the table) to 2021, with minor variations in the ranking of states, which is based on tobacco consumption patterns.

Table 1. States' shares of the eight percent share of tobacco IEPS revenue, 2021  
(in millions of current pesos)

	2021 revenue (\$)	Share (%)
National total	45,580,436.00	n/a
8% share	3,646,434.90	n/a
State:		
Aguascalientes	43,762.97	1.20
Baja California	158,511.79	4.35
Baja California Sur	34,285.59	0.94
Campeche	5,357.08	0.15
Coahuila	108,938.34	2.99
Colima	28,834.11	0.79
Chiapas	18,198.39	0.50
Chihuahua	143,300.22	3.93
Mexico City	391,542.82	10.74
Durango	42,375.97	1.16
Guanajuato	173,000.56	4.74
Guerrero	32,767.33	0.90
Hidalgo	42,564.06	1.17
Jalisco	327,323.13	8.98
State of Mexico	700,282.39	19.20
Michoacán	145,149.08	3.98
Morelos	37,022.29	1.02
Nayarit	25,907.24	0.71
Nuevo León	282,322.40	7.74
Oaxaca	24,955.25	0.68
Puebla	120,700.56	3.31
Querétaro	114,044.51	3.13
Quintana Roo	24,604.63	0.67



San Luis Potosí	68,287.31	1.87
Sinaloa	76,787.98	2.11
Sonora	96,526.29	2.65
Tabasco	55,797.78	1.53
Tamaulipas	106,517.69	2.92
Tlaxcala	21,742.99	0.60
Veracruz	96,318.48	2.64
Yucatán	68,250.72	1.87
Zacatecas	30,454.96	0.84

Note: n/a: not applicable.

Source: Authors' calculations based on the Decision Publishing the Report on Federal Revenue Assignable to Non-Earmarked Transfers (RFP) and Non-Earmarked Federal Transfers by the Tax Administration Service (SAT) (published in the Official Gazette of the Federation, multiple months).

## Methodology

- *Reform scenarios*

Table 2 presents the different scenarios by type of fiscal reform. The baseline scenario (S0) represents the tax as it was in 2020. Scenario 1 (S1) employs the 2021 IEPS rate plus a local tax of 4.5 percent. Scenario 2 (S2) involves an increase in the specific component of federal IEPS of approximately one peso per stick (bringing specific IEPS up to 1.50 pesos per stick), and scenario 3 is a combination of the two previous scenarios, taking into account both a local tax of 4.5 percent and an increase in the specific component (Table 2).

Table 2. Components of cigarette prices, by reform scenario

Description	Baseline scenario (S0)	Scenario 1 (S1)	Scenario 2 (S2)	Scenario 3 (S3)
Federal <i>ad valorem</i> IEPS	160%	160%	160%	160%
Federal specific IEPS (per stick)	\$0.5108	\$0.5108	\$1.50	\$1.50
Subnational IEPS	0	4.5%	0	4.5%
Profit margin <sup>1</sup>	10.72%	10.72%	10.72%	10.72%
Value-added tax	16%	16%	16%	16%

<sup>1/</sup> Profit margin based on Waters et al. (2010).

Source: Authors' calculations.

- **Data**

To estimate the change in prices, tobacco consumption, and public income, along with the impacts on poverty and redistributive effect, we use the MEXMOD microsimulation model, an innovative tax-transfer microsimulator for households and individuals in Mexico, launched in February 2021 by CIAD (Llamas & Huesca, 2021) and hosted at <https://www.ciad.mx/mexmod/en>. This analysis uses version 1.1, which includes all monetary transfers, indirect taxes, and direct taxes on wages and individuals levied by the government in 2021. The microdata is taken from the National Survey of Household Income and Expenditure (ENIGH) for 2020. All monetary variables in this survey are updated to 2021 prices using deflators such as the price index and the increase in the minimum wage (for a more detailed discussion of the methodological harmonization used to update values, see EUROMOD, 2018).

Due to the lack of true prices in the surveys, we approximate prices with the unit values of tobacco using Deaton’s model (Deaton, 1997).

- **Microsimulation of reforms with MEXMOD**

To estimate the change in prices, tobacco consumption, and public income, along with the impacts on poverty and redistributive effect, we use the MEXMOD microsimulation model, following a four-stage method described below.

#### Stage 1: Price changes

We estimate the unit value ( $uv$ ) as a proxy of prices, based on tobacco expenditure as a numerator ( $p$ ) and the amount of cigarettes consumed  $q$ .

$$uv = p/q \quad (1)$$

Changes in prices are obtained using the difference in expenditure on cigarettes reported by smoking households, as prices will change in each scenario as the taxable base changes.

#### Stage 2: Change in consumption

Changes in consumption (amount of cigarettes smoked) are estimated using a maximization function involving the amount consumed per household, the price change, and elasticity by tercile estimated in Huesca et al. (2020) with values of -0.479, -0.726, and -0.594 for low, middle, and high-income terciles, respectively. If  $\varepsilon_i$  denotes the price elasticity of demand for cigarettes by tercile, the change in the amounts consumed is given by equation (2):

$$\Delta q = q(1 + \sum_{i=1}^{32} \Delta p_i \varepsilon_i) - q \quad (2)$$

Where the components  $\Delta p_i \varepsilon_i$  represent the change in price in each state  $i$ , including the effect of elasticities.

### Stage 3: Household tobacco expenditure

The new household tobacco expenditure is obtained by multiplying the new price by the new amounts consumed.

Following these stages, MEXMOD produces results on the revenue generated from each tax reform and the new simulated microdata for each scenario.

### Stage 4: Impact on revenue

The percentage increase in revenue is estimated based on the new value of  $q$  and the sum of taxes paid given the new retail price in each scenario, based on the microdata.

Once the percentage change in revenue has been obtained for each scenario, we scale this increase to the official data published by the Secretariat of Finance and Public Credit (SHCP).<sup>1</sup> We address the eight percent of federal revenue assignable to non-earmarked transfers to states by estimating each state's relative contribution to revenue in each scenario as a proportion (mean share) of the national total. We then obtain the change in mean share for each reform scenario  $s$  with respect to the baseline scenario.

$$\begin{aligned} share_{sta} &= rev_{sta}/rev_{nat} \\ share_{sta}^s &= rev_{sta}^s / rev_{nat}^s \\ \Delta share_{sta} &= share_{sta}^s - share_{sta} \end{aligned} \quad (3)$$

Where  $\Delta share_{sta}$  is employed to adjust each state's relative share and the percentages presented in Table 1 above.

## Estimation of the impact on poverty

Using the official poverty lines for rural and urban areas, we calculate income poverty and chronic poverty nationally and by smoking status. Using a decomposition procedure (Biewen & Jenkins, 2005), we obtain poverty index values for each state by smoking status, and the relative contribution of each subgroup (smokers or non-smokers), and this is added to total poverty as a result of the tobacco tax reform.

We then replicate this calculation of poverty under the assumption that the full amount of tobacco tax revenue distributed to each state is then allocated to a program similar to the existing federal program "Pension for the Well-Being of Individuals with Disabilities" (which currently operates at a national level), using MEXMOD to microsimulate how this new program reduces poverty. This social program was selected because it offers the

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<sup>1</sup> In 2021, total revenue from tobacco IEPS stood at 45.66 billion pesos, of which 3.65 billion pesos were distributed to states (SHCP, 2022).

greatest potential to reduce poverty and inequality in the country (Huesca & Llamas, 2022). Beneficiaries receive a monthly transfer of 1,350 pesos.

- **Poverty analysis**

To analyze poverty, we calculate FGT poverty indices, which can be additively decomposed as

$$FGT(a) = \sum_{k=1}^{k=K} (v_k) * [FGT_k(a)] \quad (4)$$

Where  $v_k = N_k/N$  is the number of individuals in subgroup  $k$  divided by the total number of individuals (proportion represented by a population subgroup), and  $FGT_k(a = 0)$  is poverty in individuals in subgroup  $k$  according to smoking status, calculated as if each subgroup were a separate population group. As thresholds we use the value of the food basket for the chronic poverty line in 2021, which is 1,399.36 pesos and 1,828.54 pesos per month for rural and urban areas, respectively. For income poverty, these thresholds are 2,673.6 pesos (rural areas) and 3,775.94 pesos (urban areas).

We also estimate poverty curves  $P(z)$  nationally for each tobacco tax reform scenario, which enables us to visualize the impacts of each reform for any poverty line threshold as

$$P(z) = \int_0^z p(y, z) dF(y) \quad (5)$$

Where  $F(.)$  is the cumulative distribution function of income ( $y$ ) and  $z$  is the poverty line. The respective differences in poverty before and after the reform ( $S$ ) are calculated as

$$\Delta P(z) = \int_0^z p(y - S, z) dF_1(y) - \int_0^z p(y, z) dF_0(y) > 0 \quad (6)$$

These differences are positive if the reform has an impoverishing effect. This last approach allows us to calculate each tax reform's likely influence on poverty and confirm whether these changes are significant not only for a point estimate but for the whole range of existing poverty lines.

## Results

- **Price changes**

Table 3 shows a static analysis departing from a baseline scenario by using a fixed taxable base for the average price of a pack of 20 Marlboro cigarettes (INEGI, 2021) as the most sold and leading brand in the country (Jimenez *et al.*, 2008; INSP/PAHO, 2017). This calculation serves as initial condition and taxable base in percentage does not change. The change in prices and taxes with Scenario 1 shows that simply adding a local *ad valorem* tax of 4.5 percent does not lead to any substantial increase in price, which comes to 66.7 pesos per pack, an increase of just 1.1 percent. In scenario 2, the price jumps to 91.4 pesos, and in scenario 3 the same pack costs the consumer 92.1 pesos,

an increase of 38.5 percent and 39.6 percent, respectively. The retailer's margin changes because it is a function of the sum of the taxable base and the specific excise tax.

Table 3. Structure of average tobacco prices in Mexico and reform scenarios.  
(Fixed taxable base in each scenario)

Price structure	Baseline scenario		Scenario 1 (S1)		Scenario 2 (S2)		Scenario 3 (S3)	
	(\$0.5108)		(\$0.5108 + 4.5%)		(\$1.50)		(\$1.50 + 4.5%)	
	Pesos	%	Pesos	%	Pesos	%	Pesos	%
Taxable base	15.8	24.0	15.8	23.7	15.8	17.3	15.8	17.2
IEPS	35.6	53.9	36.3	54.3	55.3	60.5	56.1	60.8
<i>Federal ad valorem</i>	25.3	38.4	25.3	37.9	25.3	27.7	25.3	27.5
<i>Federal specific</i>	10.2	15.5	10.2	15.3	30.0	32.8	30.0	32.5
<i>Subnational ad valorem</i>	0.0	0.0	0.7	1.1	0.0	0.0	0.7	0.8
Retailer's margin	5.5	8.3	5.6	8.4	7.6	8.3	7.7	8.4
Value-added tax	9.1	13.8	9.1	13.6	12.6	13.8	12.6	13.7
Price	66.0*		66.8		91.4		92.2	

\*/Note: Average price of a pack of 20 Marlboro cigarettes in Mexico City in 2020.  
Source: Authors' calculations based on INEGI (2021).

Table 4, on the other hand, shows a dynamic microsimulation and how prices change with a taxable base that changes as well based on demand behavior using MexMod v1.1. The taxable base changes because a share of the smokers reduces their consumption and purchase cigarettes at a higher price. Clearly, in practice smokers face higher prices, even compared to the prices estimated with a fixed taxable base in Table 3.

Table 4. Structure of average tobacco prices in Mexico and reform scenarios (dynamic model with flexible taxable base)

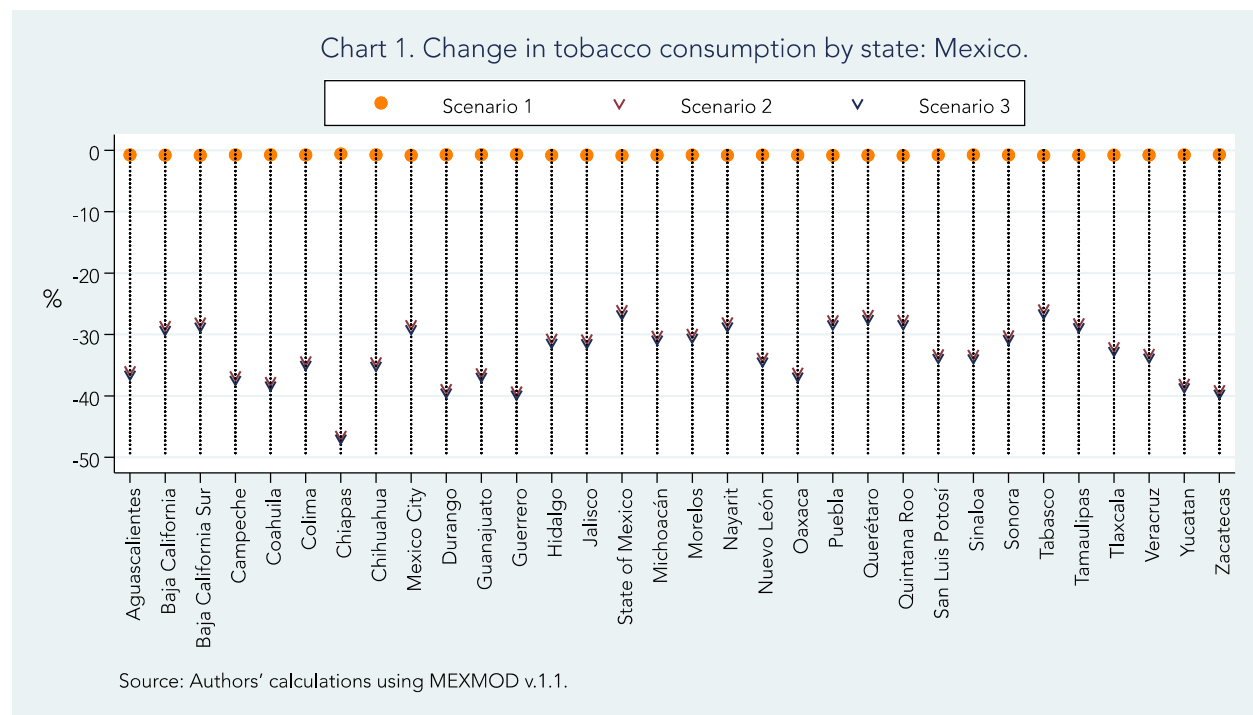
Price structure	Baseline scenario		Scenario 1 (S1)		Scenario 2 (S2)		Scenario 3 (S3)	
	(\$0.5108)		(\$0.5108 + 4.5%)		(\$1.50)		(\$1.50 + 4.5%)	
	Pesos	%	Pesos	%	Pesos	%	Pesos	%
Taxable base	15.5	23.9	15.6	23.6	21.4	19.5	21.0	19.1
IEPS	35.0	54.0	35.9	54.3	64.3	58.4	64.6	58.7
<i>Federal ad valorem</i>	24.8	38.2	25.0	37.8	34.3	31.1	33.7	30.6
<i>Federal specific</i>	10.2	15.7	10.2	15.4	30.0	27.2	30.0	27.3
<i>Subnational ad valorem</i>	0.0	0.0	0.7	1.1	0.0	0.0	0.9	0.9
Retailer's margin	5.4	8.3	5.5	8.3	9.2	8.3	9.2	8.3
Value-added tax	9.0	13.8	9.1	13.8	15.2	13.8	15.2	13.8
Price	64.9		66.3		110.1		110.0	

Source: Authors' calculations based on MEXMOD v.1.1.

In the highest-impact scenario, prices are higher at 110 pesos per pack, compared to 92 pesos in the static scenario. The lesser scenarios do not result in a substantial change in prices because the tax only produces a very small effect, which does not translate into higher prices even when a dynamic effect on consumption is factored in, as is shown in the per-pack prices in Table 4.

- *Consumption results*

Chart 1 shows the reductions in tobacco consumption brought about by the tax reforms in the states of Mexico. The change in consumption in S1 is barely noticeable due to the fact that S1 only results in a price increase of 1.1 percent, and the changes in consumption are only very slight, at between 0.3 and 0.4 percent (orange dots in the figure). On the other hand, the S2 and S3 tax reforms show significant impacts on prices, with marked changes in consumption in the country's different states. Scenario 2, in which IEPS is raised to 1.50 pesos per stick, leads to declines in consumption of over 40 percent in four states, over 30 percent in twenty states, and under 30 percent in eight states.



In order of impact, from greatest to lowest, this first group of states (where consumption drops by over 40 percent) is made up of Chiapas, Zacatecas, Guerrero, and Durango. The second group, where consumption declines by over 30 percent, comprises Yucatán, Coahuila, Campeche, Guanajuato, Oaxaca, Aguascalientes, Chihuahua, Colima, Nuevo



León, Sinaloa, San Luis Potosí, Veracruz, Tlaxcala, Jalisco, Hidalgo, Sonora, Michoacán, Morelos, Baja California, and Mexico City. The lowest drops in consumption are found in Tamaulipas, Baja California Sur, Nayarit, Puebla, Querétaro, Quintana Roo, the State of Mexico, and Tabasco.

Reform S3 produces results that are very similar to those obtained in S2 (given that the effect of the local tax reform would be barely noticeable). The differences between the two scenarios are therefore barely visible in Chart 1.

- *Revenue results*

Chart 2 shows two scatter plots by state that illustrate the relationship between the share of tobacco excise tax and state per capita income (panel A) and smoking prevalence (panel B), where the State of Mexico can be dismissed as an outlier liable to skew the relationship between the variables. Indeed, the State of Mexico (“EdoMéx”) is by far the most populated state in Mexico and has the second largest economy in absolute terms. However, as a result of the state’s large population – 84 percent higher than that of the country’s second most-populated state, Mexico City – per capita income is among the lowest in the country and the state has one of the largest impoverished populations, in absolute terms, in the country.

As expected, the plots show that each state’s share of revenue correlates positively with per capita income, a variable associated with the level of economic progress, and with smoking prevalence, a variable associated with local consumption of tobacco. These two positive correlations indicate that it is higher-income states, and states with higher levels of smoking prevalence, that generate the greatest revenue.

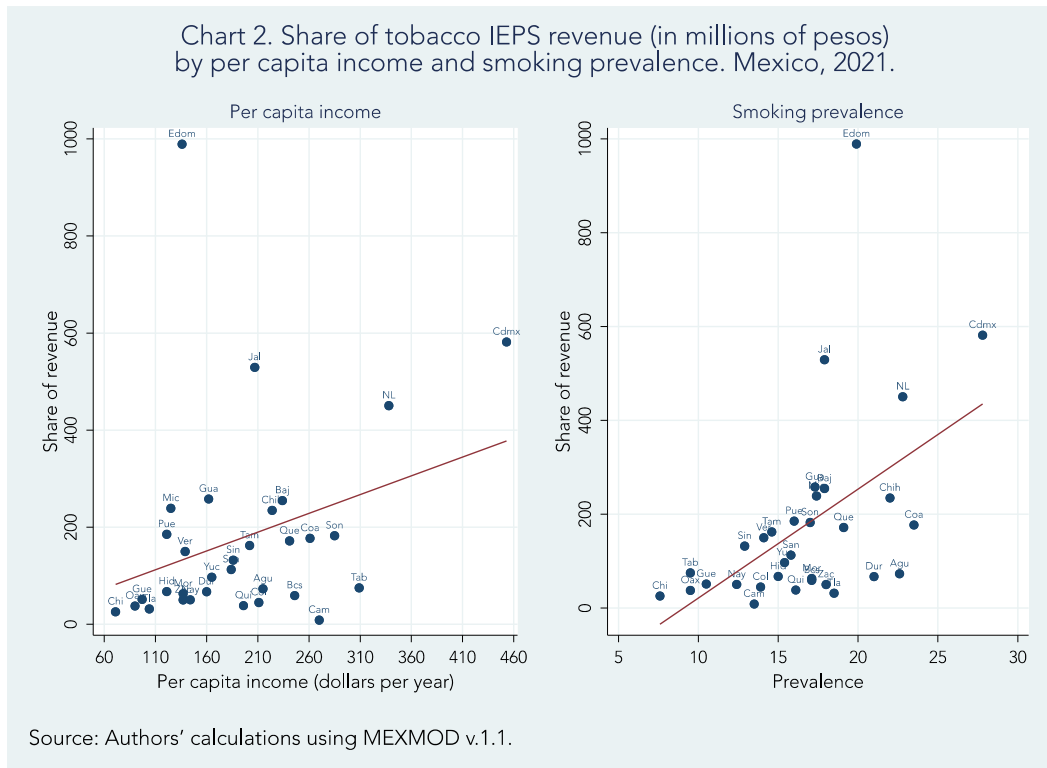


Chart 3 shows the extent of revenue generation in scenario 1 (S1). Panel A illustrates the differences between states in tax collection potential resulting from a subnational tobacco tax of 4.5 percent. Jalisco and Nuevo León gain the most local tax revenue, collecting 98 million and 87 million pesos, respectively. While these two states are not the largest economies in the country, they generate more local revenue than the largest metropolitan areas, which take third and fourth place. Since local tax was calculated on the basis of consumption patterns by state reported in ENIGH 2020, there may be inconsistencies attributable to the structure of the data, as occurred in Jalisco and Nuevo León, which show higher figures than the State of Mexico given that IEPS is calculated *ad valorem* and is subject to the value of consumption reported for each state. As shown in Charts 3 and 5 (panel A), the revenue generated by a local reform in Jalisco and Nuevo León is higher than in the State of Mexico, given that the consumption reported was 11.1 percent, 9.9 percent, and 7.8 percent of the national total, respectively.

The total revenue in S1 is the sum of both panels in Chart 3. Thus, the State of Mexico receives the most total revenue, obtaining 700 million pesos in federal IEPS (from the 8 percent non-earmarked revenue assignable to states) and 73.8 million in local tax, yielding 773.8 million pesos in total revenue for the state.

Chart 3. Tobacco IEPS revenue by state, 2021  
(Scenario 1 in millions of pesos)

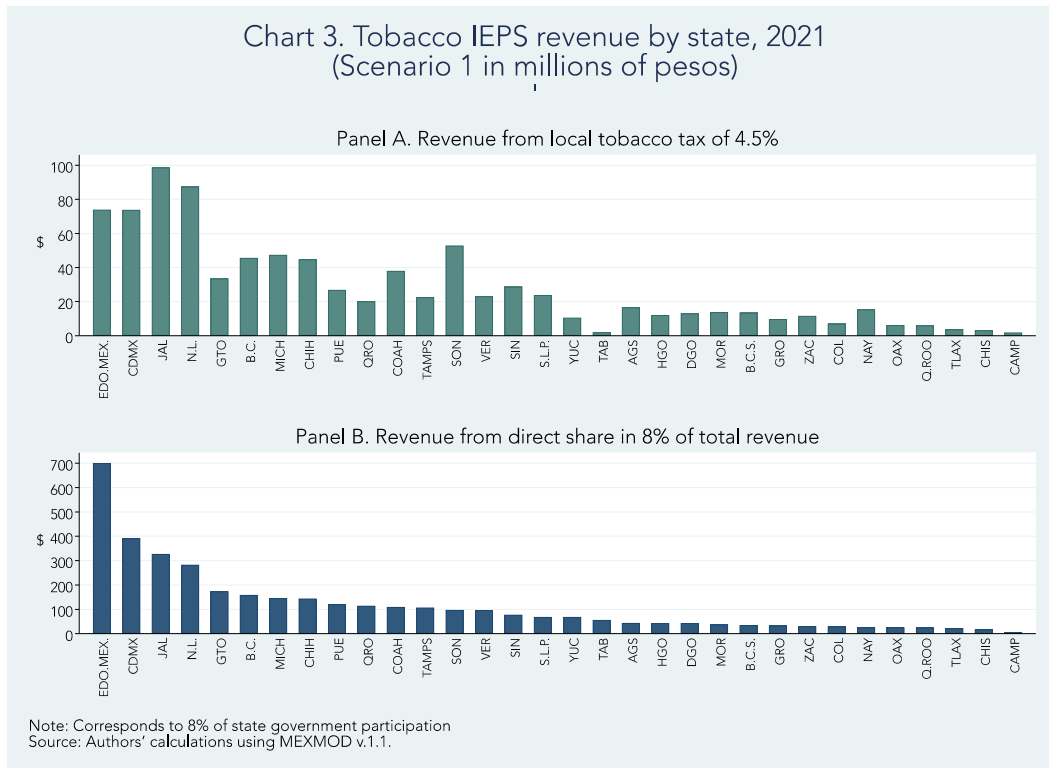
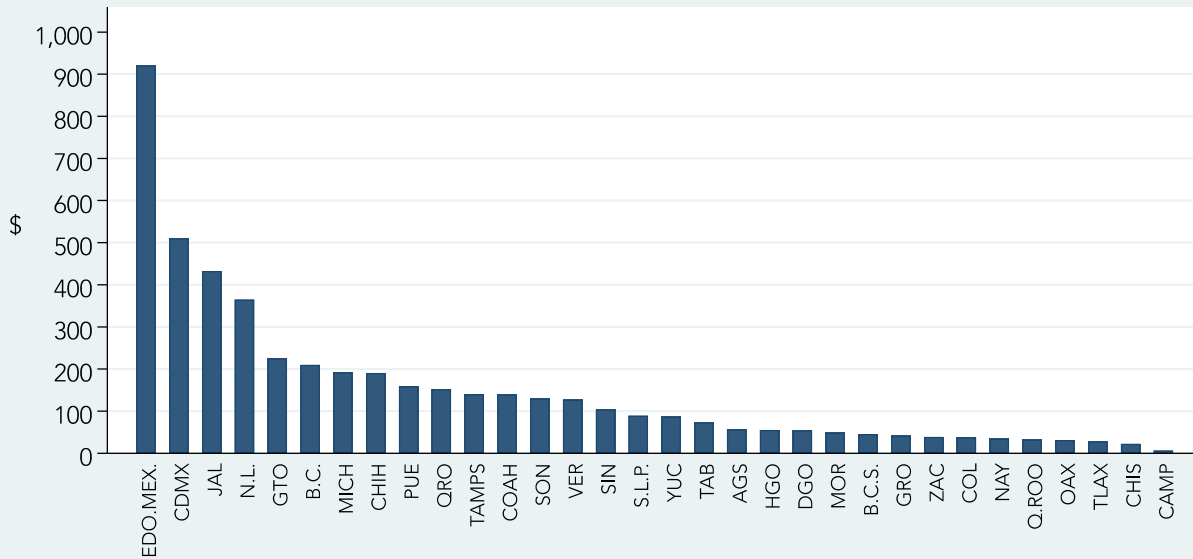


Chart 4 shows the revenue by state for S2. The increase in the specific component to 1.50 pesos per stick increases revenue for all states, positioned in the chart in order of revenue generated, from highest to lowest.

Chart 4. Tobacco IEPS revenue by state, 2021(Scenario 2 in millions of pesos)  
Revenue from direct share in 8% of total revenue



Source: Authors' calculations using MEXMOD v.1.1

Chart 5 shows tax reform scenario 3, in which the order of the states, as ranked from highest to lowest revenue, remains unchanged. In panel A, revenue generation is the same as in S1, but in panel B, total revenue increases due to the impact of the specific component of excise tax, raised to 1.50 pesos per stick.

Thus, with a specific tax of 1.50 pesos, the State of Mexico would receive 915.4 million pesos from federal IEPS (from the eight percent assignable to states as non-earmarked transfers) and would levy an additional 73.8 million pesos in local tax, yielding a total revenue of 989.2 million pesos.

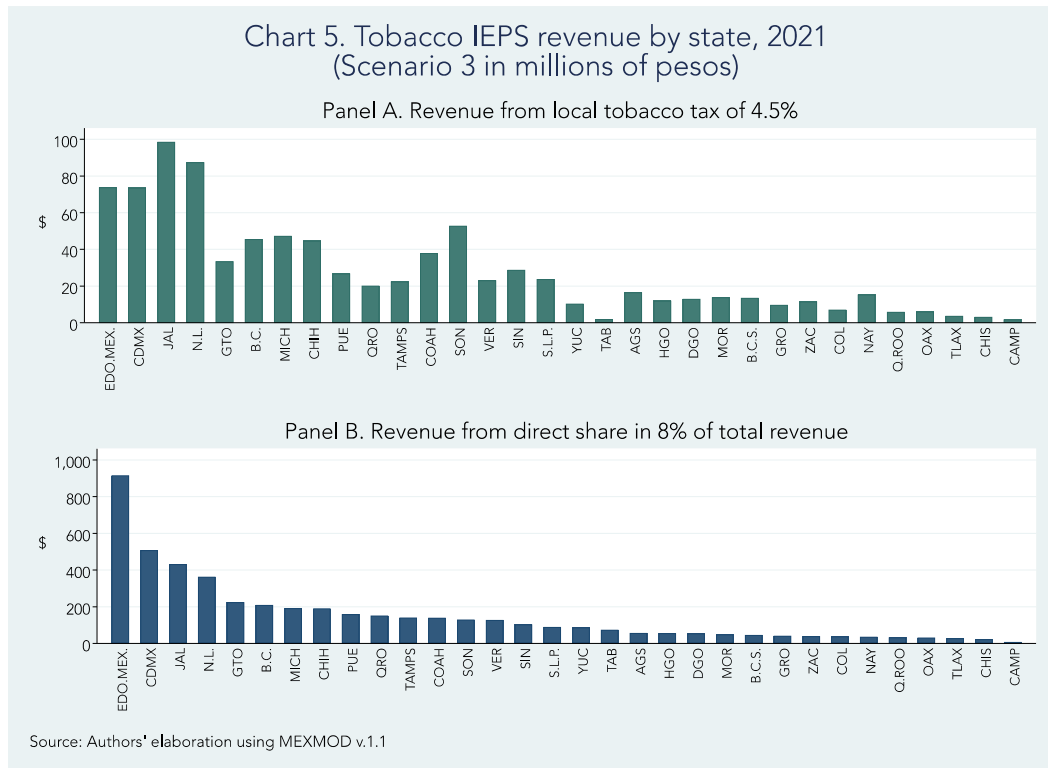
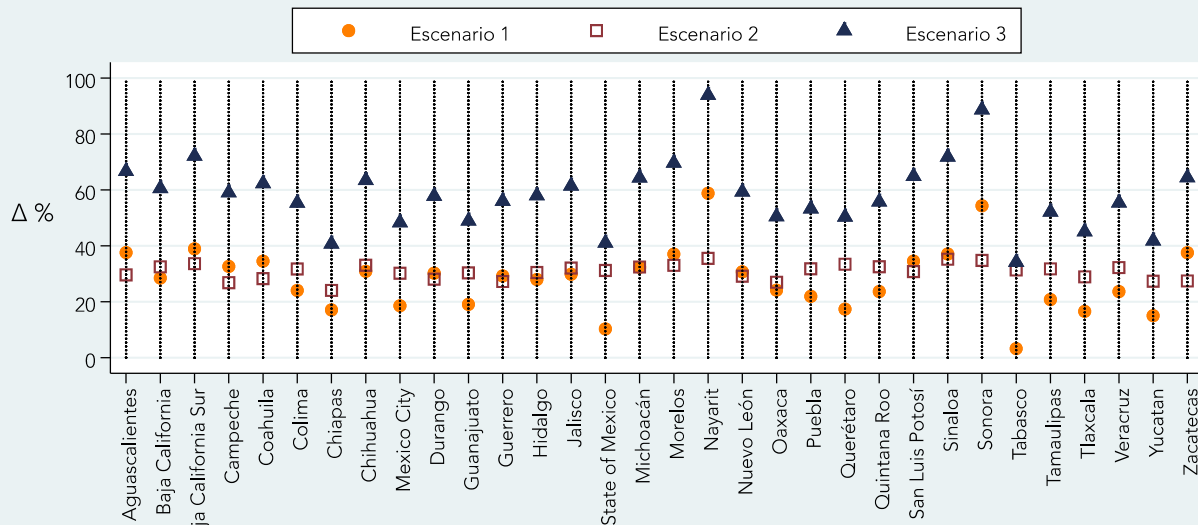


Chart 6 shows the relative changes in additional revenue. States that display a marked difference between each estimated scenario will be most responsive to a local tax reform. A sharp increase with respect to S1 is found in every state; another interesting observation is that a transition from S2 to S3 results in a stable, proportional increase in revenue in all states and at all levels of revenue.

Chart 6. Change in tobacco revenue by state: Mexico (excluding 20.6% federal revenue assignable to non-earmarked transfers, RFP)

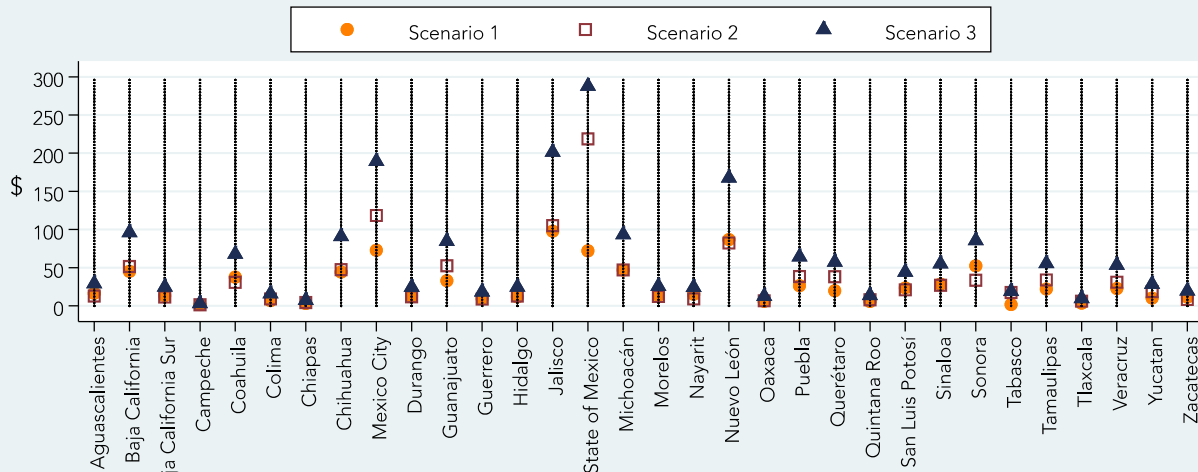


Source: Authors' calculations using MEXMOD v.1.1.

Chart 7 illustrates the range of differences in revenue increase in monetary terms, with a greater change observed in more populated states. Indeed, it is the State of Mexico (“EdoMéx”), Mexico City (“CDMX”), Nuevo León and Jalisco that see the greatest increase in absolute terms (compared to the baseline scenario), generating 287 million, 189 million, 167 million, and 201 million pesos in additional tobacco tax revenue, respectively. The greatest impact from S3, in which there is a combination of both federal and local tax increases, is felt in the State of Mexico. A total of six states generate additional revenue in excess of 50 million pesos (Baja California, Chihuahua, Guanajuato, Michoacán, Tamaulipas, and Sonora).



Chart 7. Increase in tobacco revenue by state: Mexico  
(with respect to baseline scenario, in millions of pesos)



Source: Authors' calculations using MEXMOD v.1.1.  
Note: Excludes 20.6% federal revenue assignable to non-earmarked transfers, RFP.

In sum, based on the findings on revenue behavior in the three scenarios, the greatest increase in revenue is achieved by the proposed increase in specific tax to 1.50 pesos per stick, as simulated in S2 and S3. Meanwhile, the 4.5-percent state tax is estimated to generate a total of 885 million pesos. While this amount does not alter each state's share in total tobacco tax revenue, it is substantial enough to provide state governments with some additional revenue and ensure they share some responsibility for tobacco tax policy. Thus, the four states that would see the most additional revenue from the combined effect of both taxes are the State of Mexico (287 million pesos), Jalisco (201 million pesos), Mexico City (189 million pesos), and Nuevo León (167 million pesos).

- *Poverty results*

Poverty in Mexico is complex, multidimensional, and structural, with substantial regional differences. Sadly, for some years, poverty levels in the country have hovered around 50 percent of the population, with no sign of any clear break in this downward trend; indeed, poverty has worsened as a consequence of the economic impact of COVID-19. In May 2020, during the most trying months of the pandemic (April-June 2020), calculations by the MEXMOD simulator put poverty at 56 percent and chronic poverty at 26.5 percent (Huesca et al., 2021), which is in line with official figures by CONEVAL (2021), and then 53.1 percent and 18.3 percent respectively in the months of September-November 2020, after the economy had been reopened. Following a slow recovery of the economy and employment levels, especially in the informal sector, these indicators showed a slight improvement, as just mentioned, with 53.1 percent poverty and 18.3 percent chronic

poverty. This means that any public policy must be sensitive to this situation: any tax-imposing policy should not raise poverty levels, and any cash transfer policy should be as effective as possible to mitigate poverty.

The three tobacco tax reform scenarios presented here do not affect levels of poverty or chronic poverty in any meaningful way in smoking households. Indeed, even in comparison to non-smokers, poverty levels remain lower among smoking households, in terms of both chronic poverty and total income poverty. The advantage of scenario 3 is its increased capacity to raise revenue and its neutral effect on poverty levels, that is, the lack of any of the adverse impoverishing effects that can be produced by some tax reforms (see Table 5). Certainly, any possible crowding-out effect on spending on other goods due to tobacco expenditure among consumers who continue to smoke may cause an increase in poverty to various degrees, depending on the severity of the crowding-out effect (García-Gómez et al., 2021). However, this falls outside of the scope of our work.

Table 5. Poverty levels and chronic poverty in Mexico in smoking households, 2021  
(data converted to a percentage of the population\*)

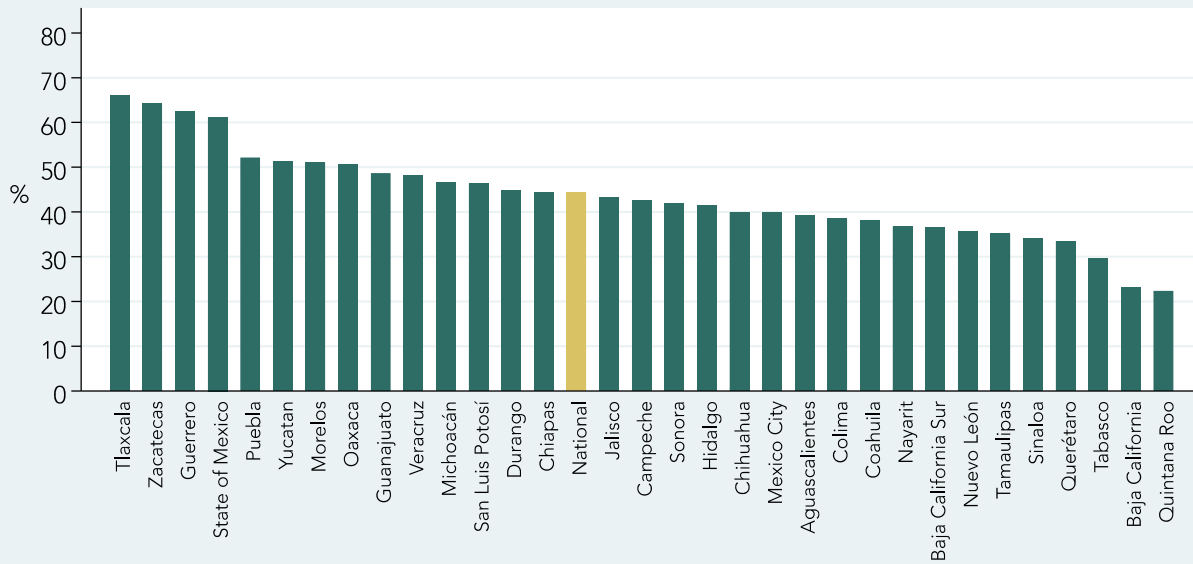
	Baseline	S1	S2	S3
Poverty	53.1	53.1	53.1	53.1
Smokers	43.6	43.6	44.2	44.2
Non-smokers	53.5	53.5	53.5	53.5
Chronic poverty	18.3	18.3	18.3	18.3
Smokers	9.9	9.9	10.2	10.4
Non-smokers	18.6	18.6	18.6	18.6

\* All indices are statistically significant at the 0.01 level.

Source: Authors' calculations based on MEXMOD v.1.1.

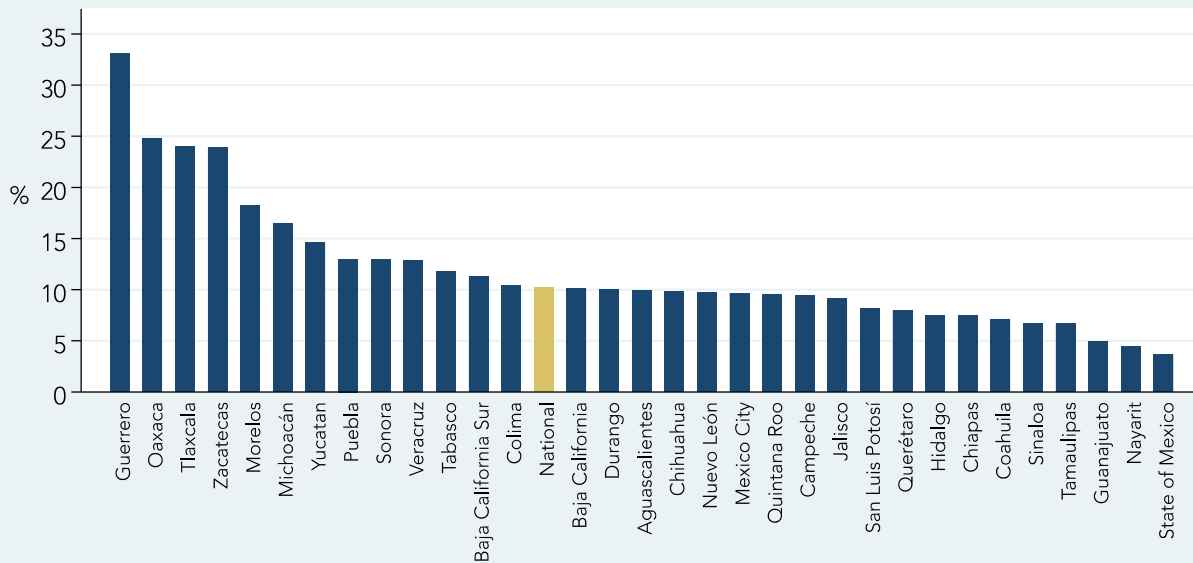
Consequently, hereafter our analysis focuses solely on poverty among smokers for S3, which is the ideal reform scenario, with high declines in consumption, greater state revenue, and a near-neutral impact on poverty. Charts 8 and 9 show a greater proportion of poor and chronically poor smokers in poorer states, and any tax reform that discourages consumption, such as an increase in the specific component to 1.50 pesos per stick, will have a greater deterrent effect among this segment of the population, without driving them further into poverty. In addition, an increase in the specific component narrows the gap between prices of different brands of cigarettes, increasing the average price and leaving the consumer little leeway to switch to cheaper brands.

Chart 8. Poverty among individuals from smoking households by state, 2021: reform scenario S3



Source: Authors' calculations using MEXMOD v.1.1

Chart 9. Chronic poverty among individuals from smoking households by state, 2021: reform scenario S3



Source: Authors' calculations using MEXMOD v.1.1

Chart 10. Relationship between poverty and revenue and between poverty and reduction in tobacco consumption in Mexico, by state, 2021 (percentage)

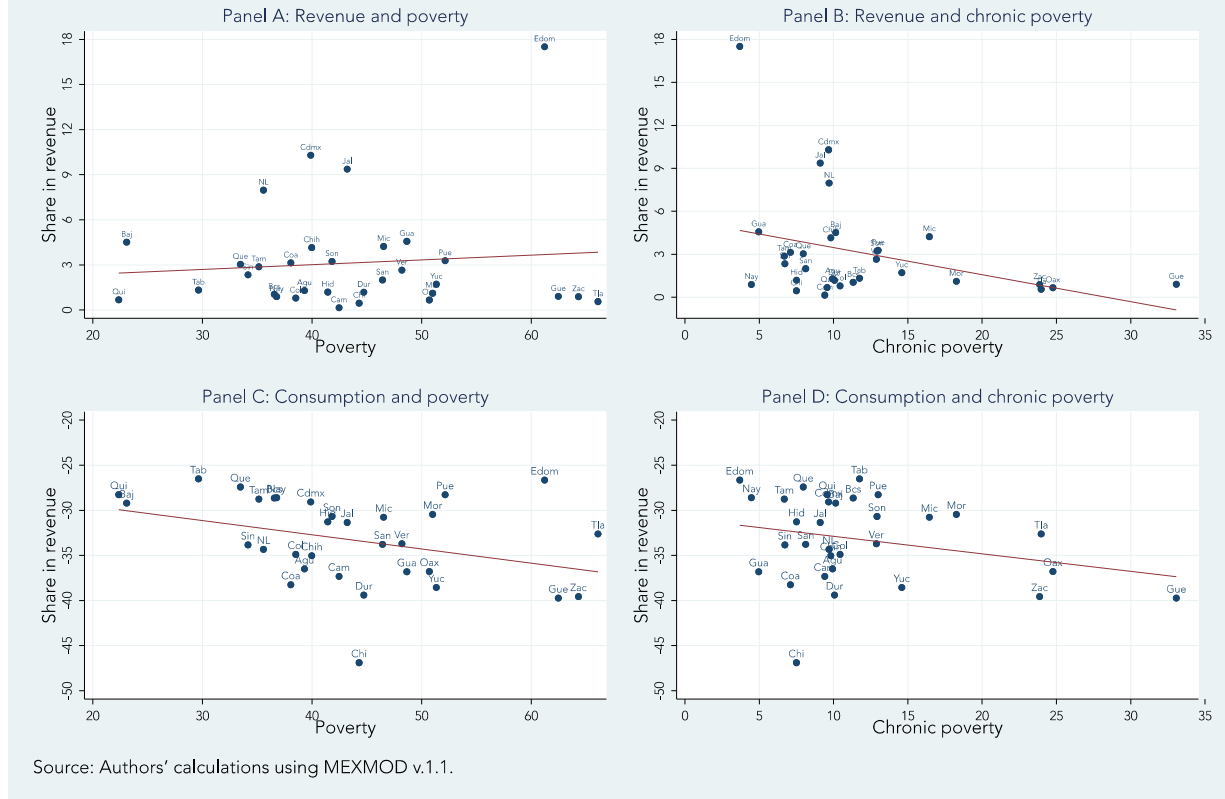
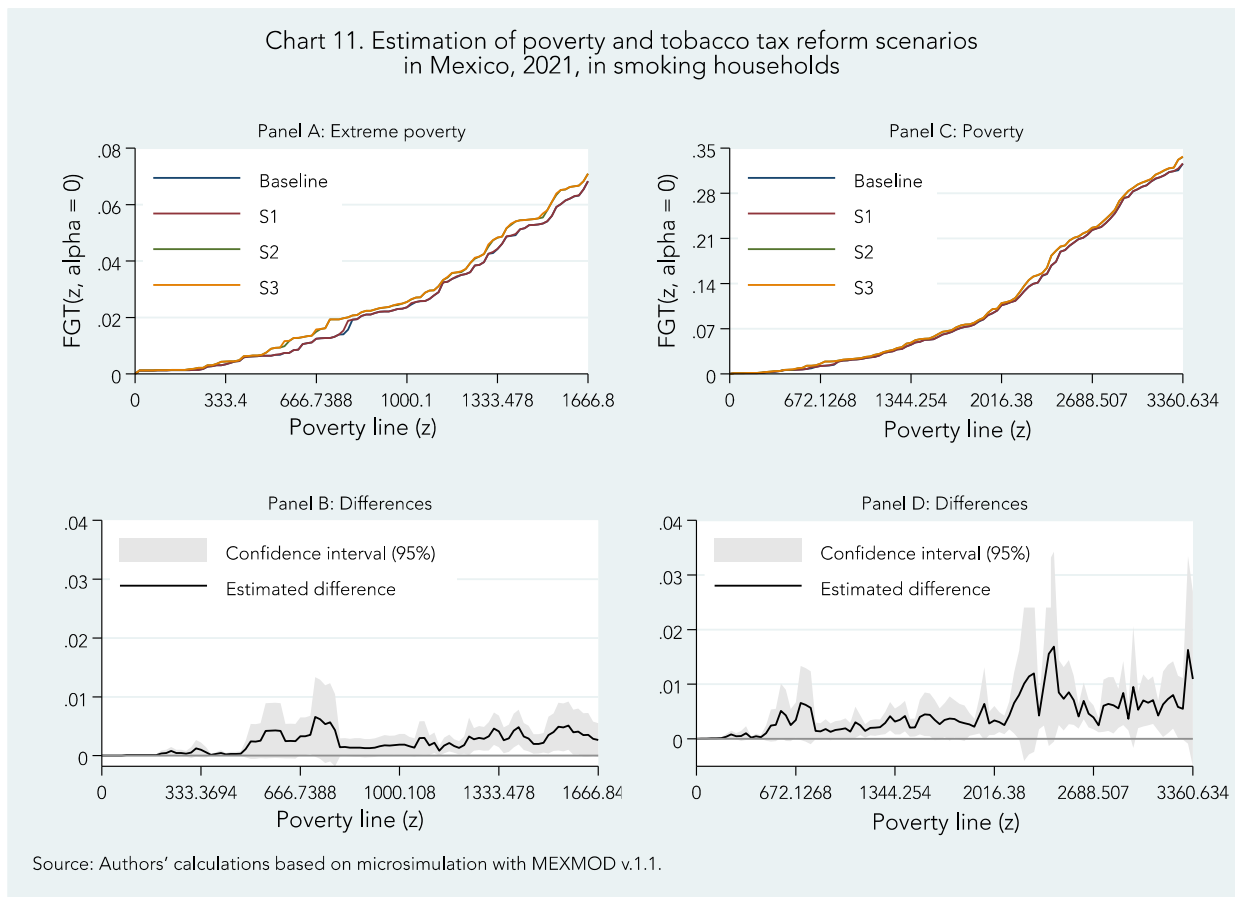


Chart 10 shows the relationships between revenue and reduction in consumption at different levels of poverty in the states of Mexico. Both types of poverty yielded negative correlations with consumption, while with revenue, the correlation was only negative with chronic poverty. The State of Mexico appears to be an outlier, with a high level of total poverty (panel A) but a lower level of chronic poverty (panel B). The same trend was observed in the states of Jalisco, Nuevo León, and Mexico City. These states are among the most heavily populated in the country, so the lower levels of chronic poverty cause a rightward shift in the trend in panel B, resulting in a negative correlation of poverty with respect to revenue.

Lastly, Chart 11 shows the impact that the tobacco tax reform has on poverty levels among individuals living in smoking households in Mexico in each scenario considered. The FGT poverty curves show cumulative poverty for any level of the poverty line in the range (0, z+) where z is the poverty line. This confirms that no matter what threshold is employed, there is no substantial increase in poverty as the differences in panel B and D in the reform for S3, with respect to the baseline, are no greater than one percent for chronic poverty, and no greater than two percent for total poverty, among those living in smoking households.

Chart 11. Estimation of poverty and tobacco tax reform scenarios in Mexico, 2021, in smoking households



Our findings are comparable to those of a study on the regional impact of tobacco tax in India, which showed substantial differences in four states – Karnataka, Assam, Uttar Pradesh, and Maharashtra – and between income quintiles, with a tax of 10 rupees per stick plus 10 percent *ad valorem*. The study confirms that this tax would achieve a greater impact on consumption in lower-income households, in the same way as in Mexico, such that they would bear a smaller proportion of the price increase. However, the impacts vary between the four states due to different rates of prevalence, income, and poverty (Wu et al., 2020). For example, the ratio between the outcomes of the first and fifth-income groups is largest in Uttar Pradesh due to a considerable difference in prevalence (11.4 vs. 6.3 percent for the other states). Consequently, the poor in Uttar Pradesh would receive a significantly greater benefit than the national average. The same effect would be found in the Mexican states of Oaxaca, Chiapas, and Guerrero.

- **Redistribution results (pro-poor programs)**

The results presented below show the scope and benefits of a tobacco tax reform, in each of the three reform scenarios, when revenue is allocated to a hypothetical social program similar to the federal government's "Pension for the Well-Being of Individuals with Disabilities" (*Pensión para el Bienestar de las Personas con Discapacidad*). Table 6 shows that scenario 3 could enable as much as a 71-percent increase in the number of

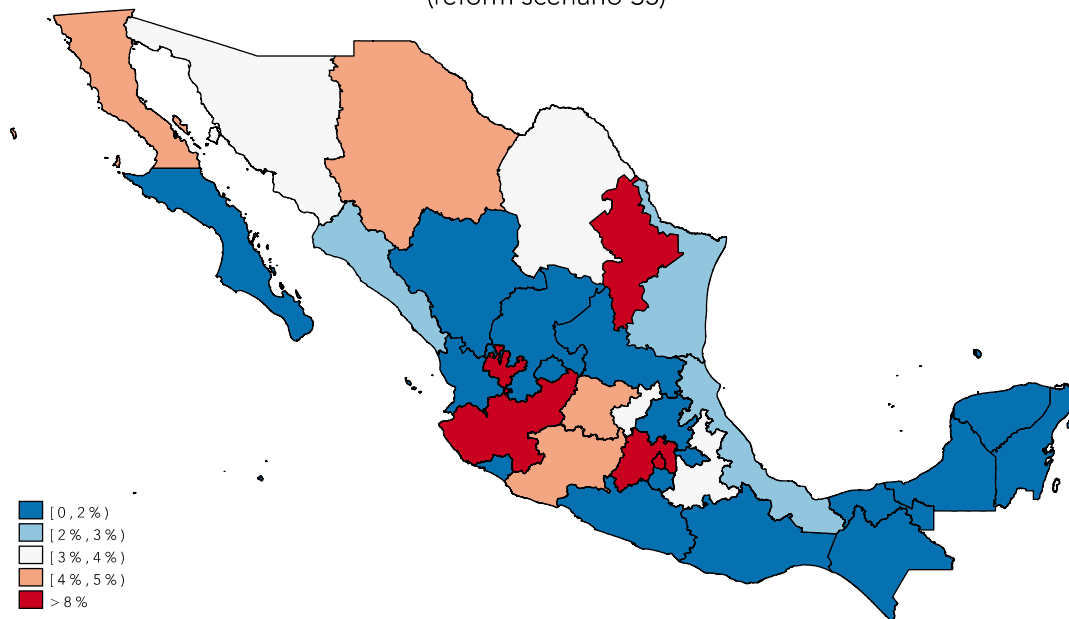
beneficiaries, thus reaching an additional 348,773 random individuals who fulfill the program criteria. Map 1 shows where the additional funds generated by the reform in scenario 3 would be distributed, by state, providing insight into where these transfers would have the greatest impact.

Table 6. Potential beneficiaries of the hypothetical program for individuals with disabilities and impacts on poverty: Mexico, 2021

	Baseline	S1	S2	S3
Potential revenue (millions of pesos)	3,652.53	4,529.61	4,790.78	5,650.13
Additional beneficiaries	n/a	279,605	295,727	348,773
Total beneficiaries	492,177	771,782	787,904	840,950
Poverty (%)	53.1	53.0	53.0	53.0
Chronic poverty (%)	18.3	18.2	18.2	18.2

Source: Authors' calculations based on MEXMOD v.1.1.

Map 1. Concentration of beneficiaries by state (reform scenario S3)



Source: Authors' calculations using MEXMOD v.1.1.

The highest proportional increases in beneficiaries are found in states that experience the largest absolute increases in revenue as a result of the tax reform; the number of beneficiaries could rise over eight percent in the State of Mexico, Mexico City, Jalisco, and Nuevo León, followed by Baja California, Chihuahua, Michoacán, and Guanajuato, which see increases of between four and five percent. Increases of three to four percent can be found in Sonora and Coahuila, followed by Veracruz, Tamaulipas, and Sinaloa,



where the number of beneficiaries increases by between two and three percent. Smaller increases of between 0.1 and two percent are observed in the remaining 19 states, which include Oaxaca, Guerrero, and Chiapas – states with the highest levels of relative poverty in Mexico – but also the state of Baja California Sur, which has the lowest level of relative poverty.

## Discussion

The results of this research offer some guidance to identify the impacts of subnational tobacco tax policy in Mexico. Firstly, more socioeconomically developed states of Mexico will experience reductions in tobacco use of no more than 30 percent, lower than the decrease in consumption observed in less socioeconomically developed states, which could reach as much as 45 percent under a scenario in which both the federal and state tax reforms are introduced. Furthermore, simply introducing a local *ad valorem* tax would not result in any meaningful impact on consumption but could generate close to 1 billion pesos in additional revenue for states. This study also found there is no significant nationwide increase in poverty levels. Though many smokers will quit or will reduce their consumption because of an increase in prices after a tax, on average in the households where smoking continues, the increase in poverty is no higher than two percent.

Undoubtedly, research measuring the regional impact of tobacco tax is novel and while little evidence is available for Latin American countries, these studies do yield adequate results that can serve as an important framework for public policy makers. They also enrich and promote debate among academics, civil servants, and local legislators to push an agenda to further raise discussion on the application and scope of subnational taxes and their deterrent effect on smoking.

While the study has various strengths, some possible limitations should be outlined. For example, any introduction of a new local tax within a federation should take into account the mobility of the taxed good, and the possibility of tax avoidance or evasion, which falls outside of the scope of this analysis. Another aspect that should be considered is the brand of cigarettes smoked; this study only looks at the most-sold pack of 20 cigarettes. Furthermore, while elasticity in this research does vary by socioeconomic status, it remains constant for all states. Certainly, one advantage is that each state is able to set its own consumption patterns based on its own capacity and levels of tobacco spending. This in itself allows us to calculate differential impacts on consumption, tax revenue, and poverty levels.

Another relevant limitation is that local tax revenue was calculated based on consumption patterns by state reported by the ENIGH 2020 survey. This resulted in higher revenue for Jalisco and Nuevo León than for the State of Mexico, given a reported consumption level

of 11.1 percent, 9.9 percent, and 7.8 percent of the national total, respectively. The main reason for this is that the state *ad valorem* tax calculation is dependent on the value of consumption reported by each state, while the specific IEPS will depend on the quantity of cigarettes smoked. The indication here is that the State of Mexico reports greater consumption in terms of quantity smoked, but the value of consumption is lower than other states, meaning that revenue from local tax is lower than in Jalisco and Nuevo León, while revenue from specific IEPS is higher.

A key strength of this research, however, is that it measures, for the first time, the changes that would occur in consumption and tax revenue as a result of both a federal and state tax reform, considering the particular socioeconomic characteristics of each state within the Mexican context.

Another challenge is tax harmonization or standardization among the various jurisdictions to avoid a so-called “race to the bottom” in which local governments engage in a form of tax competition that only drives lower tax rates and cuts revenue. It should be made clear that this study was conducted in a context of dynamic behavior that considers price elasticities and decreases in consumption. This is a strength and means that the prices calculated are not underestimated because the taxable base changes in each scenario. However, it is possible that we have underestimated poverty levels by not considering aspects like the crowding-out effect, which could lead to a greater increase in poverty than expected or calculated due to changes in spending patterns and the lack of expenditure assumptions that would cause additional impoverishing effects and impact the income of families that smoke. This does not constitute a weakness in relation to the results obtained in terms of revenue and expected declines in consumption.

The results show that introducing a 4.5 percent tax does not increase poverty levels among smoking households but does generate a substantial pool of funds that can be earmarked for medical care resulting from smoking-related diseases or to support the most vulnerable smokers during a period of rehabilitation.

The results suggest that local tax revenue is too low to affect the states’ original revenue-raising capacity. A local tax of 4.5 percent was not found to have any distorting effect on revenue such as to alter the previously demonstrated progressivity of a specific tax increase of one peso per stick (Huesca et al., 2022), but can still have a considerable effect on the level of revenue available.

Upon taking office, the current federal administration declared that taxes would not increase. Despite this, bills have been submitted to the Congress of the Union to reform the Excise Tax on Production and Services Law (*Ley del IEPS*) and increase the specific component of tobacco tax, although they have not progressed to the deciding legislative commission. In December 2022, the federal government introduced the “Decree to Reform, Add, and Repeal Various Provisions of the Regulations of the General Law for

Tobacco Control” (*Decreto por el que se reforman, adicionan y derogan diversas disposiciones del Reglamento de la Ley General para el Control del Tabaco*), with a focus on widening restrictions on smoking areas and advertising. These measures fulfill in part the WHO Framework Convention on Tobacco Control, without increasing taxes or granting constitutional powers to local or subnational governments that would standardize or homogenize tax on consumption in a way that stops local tax avoidance and evasion.

As a result, indirect taxes remain under the WHO-recommended threshold of 75 percent of the retail price of tobacco. In this respect, it is worth noting that in countries like Argentina, Brazil, and Chile, total tax accounts for between 76 and 81.55 percent of the retail price of a pack of cigarettes, while Mexico lags behind at 67.6 percent, even trailing Venezuela where taxes make up 73.4 percent of retail prices. The global average stands at 53.8 percent.

Without a doubt, introducing these local taxes provides a boost to the national strategy to control and reduce smoking, while contributing tax funds to implement programs to combat addiction and treat diseases caused by tobacco. Although states do receive some funds from tobacco taxes, it is important to note that they are not earmarked and only constitute a minimal proportion of total revenue.

## Conclusions

This study has found that a subnational tobacco tax reform results in a greater decrease in consumption in states with higher levels of poverty, but the increase in tobacco tax revenue in these states will be smaller. The opposite occurs in states with lower levels of poverty. A 4.5% *ad valorem* local tax reform would generate 885 million additional funds for Mexico’s states that, together with federal tax revenue (5.65 billion pesos), could enable a 71-percent increase in the number of beneficiaries of a program for individuals with disabilities.

An increase in the federal specific tax of one peso per cigarette leads to a decrease in consumption of over 40 percent in 4 states, over 30 percent in 20 states, and under 30 percent in eight states. Moreover, none of the tobacco tax reforms simulated, affect levels of poverty in a meaningful way in smoking households; in fact, in comparison with non-smoking households, poverty levels remain lower in terms of both chronic poverty and total income poverty.

One important recommendation that emerges from this study is that any increase in the local tax rate or fixed rate of tobacco IEPS should be allocated to address national and state health care problems. To achieve this, the additional revenue must be coupled with a reform of legislation that would enable tax to be earmarked for non-communicable diseases associated with smoking, in light of the fact that currently, states only receive

28.5 percent of tobacco IEPS revenue, an amount that continues to fall short of what is needed to treat smoking-attributable diseases.

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