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Tobacco industry pricing strategies during recent tax adjustments in Mexico: evidence from sales data

Belen Saenz-de-Miera ,¹ Kevin Welding ,² Tuo-Yen Tseng ,² Graziele Grilo ,² Joanna E Cohen ²

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¹Department of Economics, Autonomous University of Baja California Sur, La Paz, Baja California Sur, Mexico

²Institute for Global Tobacco Control, Department of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

Correspondence to

Belen Saenz-de-Miera, Department of Economics, Autonomous University of Baja California Sur, La Paz 23080, Mexico; b.saenzdm@uabcs.mx

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ABSTRACT

Introduction Previous studies have identified pricing strategies that the tobacco industry employs to try to minimise the impact of tobacco taxation, but these studies are mostly about high-income countries. This research examines industry price responses to a recent cigarette tax increase in Mexico, including in the capsule cigarette segment that has expanded rapidly in Latin America.

Methods Data of cigarette prices and sales in Mexico between October 2018 and September 2021 licensed from NielsenIQ were used following a quasi-experimental design to analyse price changes after excise tax increases with fixed effect models by product. To explore heterogeneous responses, estimates were disaggregated by cigarette attributes such as presence of capsules and market segment. Differential shifting was also assessed.

Results Increasing the tobacco tax from 2011MX\$0.35(≈US\$0.02) to 2020MX\$0.4944(≈US\$0.0283) in January 2020 was associated with an overall 8% cigarette price increase in real terms. However, some cigarette types, including premium to discount segments, exhibited price increases larger than the tax increase, which reduced the relative price of ultra-low-priced cigarettes. Instead of a single hike, prices were gradually raised throughout the first months of 2020 for all cigarette types. A combination of both pricing strategies was employed for capsule cigarettes. The 2021 smaller tax adjustment for annual inflation was fully passed onto consumer, maintaining real prices constant.

Conclusions The industry's ability to raise prices more than the tax increase and manage these price increases smoothly suggests that there was room for larger tobacco tax increases in Mexico. Future developments on tobacco taxes could consider a fully specific tax structure or minimum taxes to mitigate the adverse effects of market segmentation and differential shifting.

INTRODUCTION

Numerous studies show that tobacco taxes are effective at reducing consumption, preventing initiation and increasing cessation.^{1,2} However, these effects depend on the extent to which taxes are passed onto consumers. Since the global tobacco industry is highly concentrated in a handful of transnational companies, they wield substantial pricing power, enabling strategic responses to tax changes for profit maximisation.³

A recent literature review shows that the tobacco industry employs diverse pricing strategies to undermine excise tax policies. These include heterogeneously shifting taxes between products,

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The tobacco industry uses different pricing strategies in high-income countries to try to counteract the effects of taxation, but less is known about these strategies in low and middle-income countries, particularly for capsule cigarettes.

WHAT THIS STUDY ADDS

- ⇒ We analyse cigarette price changes after a recent tax adjustment in Mexico.
- ⇒ Rather than immediately, cigarette prices increased gradually over the first months following the tax implementation.
- ⇒ Moderate over-shifting reduced the relative price of ultra-low-priced cigarettes, particularly due to small producers other than the major transnationals. Both strategies were applied to capsule cigarettes.

HOW THIS MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The emergence of an ultra-low priced market segment in Mexico, where producers have absorbed recent tax adjustments, highlights the importance of considering a tax structure with a completely specific tax or minimum excise taxes.

launching new brands or products, promotions and price discrimination, price smoothing, reducing pack sizes and changing product attributes such as cigarette length or production processes.⁴ The most documented strategy is differential shifting, with overshifting (price increases above tax increases) for some market segments and undershifting (taxes absorbed by producers) for others.^{5–8} Other strategies have only been observed in high-income countries (HICs), such as price smoothing, which involves small, gradual price adjustments after tax increases instead of a large change.^{9,10} In the UK, the combination of overshifting for premium brands and undershifting for cheaper products in response to tax increases provided consumers numerous options to trade down instead of quitting over the past decade.^{11,12} Yet the evidence is mostly from a few HICs, and little is known about these strategies in low and middle-income countries.⁴ Two recent exceptions include a 2022 Colombian study¹³ and a 2023 study of 12 African countries.¹⁴ The first found evidence of undershifting for cigarette packs—especially for mid-priced brands—and overshifting for single sticks. The second found mixed



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evidence of similar differential shifting by domestic and transnational producers. This study aims to assess tobacco industry pricing strategies in Mexico, focusing on differential shifting and price smoothing during a recent excise tax adjustment.

Mexico provides an interesting setting to analyse industry price responses to tax policy for several reasons. First, previous research from 2008 to 2011 constitutes a precedent to understand how industry tactics have evolved.¹⁵ This period covers different tax increases and an important change in the structure. Since its introduction in 1981, the tobacco tax (Special Tax on Production and Services, IEPS) had been ad valorem (160% of the price to the retailer from 2009), but starting in 2010, a specific component of 2010MX\$0.04 (≈US\$0.0023) per cigarette was added (which was increased to 2011MX\$0.35 (≈US\$0.02) in 2011). Evidence indicated that minor increases in the ad valorem component in 2008–2009 raised the relative price of international (premium) brands compared with national (discount) brands, but the substantial increase in the specific component in 2011 had the opposite effect, reducing price differentials between market segments.¹⁵

Second, the stagnation of tobacco taxes between 2011 and 2019 in Mexico paved the way for the industry to position capsule cigarettes (ie, cigarettes containing crushable capsules in their filters that allow consumers to flavour the cigarette) using strategic pricing. Specifically, Pall Mall grew rapidly during this period (3% to 14% from 2011 to 2016) due to its marketing as a brand with premium features at relatively low prices,¹⁶ leveraging capsules extensively.¹⁷ A recent study highlighted the ongoing, rapid expansion of the capsule cigarette market in Mexico in 2018–2021, revealing that most were marketed in medium or premium price tiers.¹⁸ However, no research has evaluated further the evolution of relative prices for capsule cigarettes.

Third, while Mexico remains below the WHO recommendation of taxing cigarettes at 75% of their prices (current average is 69.2%),¹⁹ some progress was recently made with the increase in the specific tax from 2011MX\$0.35 (≈US\$0.02) to 2020MX\$0.4944 (≈US\$0.0283) in January 2020 to account for accumulated inflation in the previous 9 years (November 2010–November 2019).^{16 20} An automatic adjustment mechanism was also implemented to account for annual inflation in subsequent years, so that in 2021, 2022 and 2023, the specific tax was 2021MX\$0.5108 (≈US\$0.0292), 2022MX\$0.5484 (≈US\$0.313) and 2023MX\$0.5911 (≈US\$0.0338).^{21–23} An analysis of the prices used to calculate the national consumer price index suggests that the 2020 tax change increased real retail prices and was fully passed to consumers,¹⁶ but data limitations prevented assessment of heterogeneous effects by cigarette attributes.

This analysis employs a dataset that allows a detailed examination of the tax shifting within the cigarette market, including the capsule segment. Considering the rapid growth in capsule cigarette consumption,²⁴ especially in Latin America and in Mexico specifically,^{18 25} analysing whether price responses may be different for this type of cigarettes is relevant globally.

METHODS

Data

The study employs monthly data of cigarette prices and sales in Mexico between October 2018 and September 2021 licensed from NielsenIQ, a market research company that collects information about the tobacco market worldwide. This period covers the January 2020 tobacco tax increase, the January 2021

automatic adjustment and the onset of COVID-19 in late March 2020, which caused temporary suspensions of non-essential activities (in April–May 2020), including cigarette production.

Data come from both modern (retailers with a robust infrastructure that can electronically transfer sales data externally, including supermarkets, convenience stores, pharmacies and government-owned outlets) and traditional (retailers without an electronic infrastructure, including traditional stores, minimarts, booths and kiosks) trade channels. Disproportionate random sampling stratified by store type and geographic location is used to select a representative sample that could be generalised to the national level. If a data sharing agreement cannot be established with a selected retailer, a replacement is obtained following the same sampling principles. For modern trade channels, data are collected each time cigarettes are purchased and scanned at participating retailers. For traditional trade channels, data are collected through monthly field audits, in which auditors visit participating retailers to record purchases. Data are provided at the SKU (stock-keeping unit) level (283 codes for 36 months, n=10 188), identifying the manufacturer (Philip Morris Mexico, PMM; British American Tobacco, BAT; Japan Tobacco International, JTI; and other minor producers), brand (eg, Marlboro), variant (eg, Marlboro Fusion Shine), flavour (menthol vs non-menthol, where non-menthol can be unfiltered, light—assessed through descriptors such as colours—, or full flavour), pack size (cigarettes per pack) and presence of capsules (yes/no). Due to no sales for some SKU codes in some months, we use an analytic sample of 5988 price observations (see the sample description in online supplemental table A1). All prices were converted to Mexican pesos of April 2022 (Apr2022MX\$) using the National Consumer Price Index to remove the effect of inflation.²⁶

Since our licence does not allow presenting results at the brand level, we use five well-differentiated groups along the price distribution: premium, medium, discount, ultra-low and illicit (online supplemental figure A1). Illicit brands are defined based on previous studies of illicit trade in Mexico. Specifically, brands are considered illicit if they are not on the tax authority's lists of brands approved for the Mexican market or appear on the health authority's lists of seized illicit brands. This definition has been validated through inspection of discarded packs in which characteristics beyond the brand are analysed.²⁷

Descriptive statistics

We first compare unweighted average annual prices before and after the tax adjustment. Then, we use sales-weighted monthly figures to present cigarette price trends; averages in each posttax month (from January 2020) are compared with those from the same pretax month (2019) with simple t-tests.

Modelling price changes

Since the tobacco tax is uniform across the country, there is not a suitable control group to evaluate its effects on cigarette prices in Mexico. Therefore, we use a quasi-experimental approach comparing outcomes before and after the intervention with fixed effect models by product:

$$y_{imy} = \alpha + \beta_1 Tax2020_{imy} + \beta_2 Tax2021_{imy} + \eta Y2018_y + \lambda t_{my} + \gamma_i + u_{imy}$$

where y_{imy} are real prices of product i , in month-year my , $Tax2020$ and $Tax2021$ are dummies equal to 0 before each tax increase and 1 after (January 2020 and January 2021, respectively), $Y2018$ is a dummy variable for 2018 with 2019 as the reference year, t is a month-year linear time trend from 1 to 36 (with 1=October 2018), γ are fixed effects for non-time varying

unobservable attributes of products such as quality, and u_{imj} is an error term. Therefore, β_1 denotes the price change after the 2020 tax compared with 2019, and β_2 denotes the additional price change after the 2021 tax compared with 2019. To analyse price smoothing, we use an alternative specification with dummies for each month instead of the *Tax2020* variable.

Robustness checks include dynamic specifications with lags of the dependent variable and aggregated models by month (interrupted time series analysis). We also use an alternative definition of the intervention that considers the tax increase announcement (November 2019) instead of the entry in force (January 2020). All analyses are conducted in Stata V.16.²⁸

Pass-through analysis

To determine the extent to which the tax was passed to consumer prices, expected prices with a 100% pass-through for 2020 (2021) were calculated from 2019 (2020) average prices (online supplemental table A2). First, the 2019 real price to the retailer was estimated by subtracting all taxes in force that year and the retailer margin (ad valorem IEPS=160% of the price to the retailer, specific IEPS=Apr2022MX\$0.4070 per cigarette, Value Added Tax or VAT=16% of the consumer price and retailer margin=30% of the price to the retailer) from the average cigarette price observed. Then, to obtain the expected real cigarette price for 2020 (2021) with a 100% pass-through, the 2019 (2020) price to the retailer was kept constant and the corresponding taxes were added (including the higher specific IEPS of Apr2022MX\$0.5560 in 2020 or Apr2022MX\$0.5437 in 2021).

RESULTS

Descriptive analysis of cigarette price trends

Figure 1 compares average cigarette prices in 2019 and 2020 (see detailed estimates in online supplemental table A3). Overall, a real price increase of 8.0% (from Apr2022MX\$2.49 to Apr2022MX\$2.69; $p<0.05$) is observed. This pattern holds for different cigarette attributes ($p<0.05$), except for producers other than the three main transnationals. Increases are relatively larger for capsule (8.2% vs 6.0% for non-capsule), unfiltered (25.7% vs <10% for light, mint and full flavour), discount (12.5% vs <10% for other market segments), smaller pack sizes (13.9% and 15.5% for 14 and 15–18 cigarettes per pack,

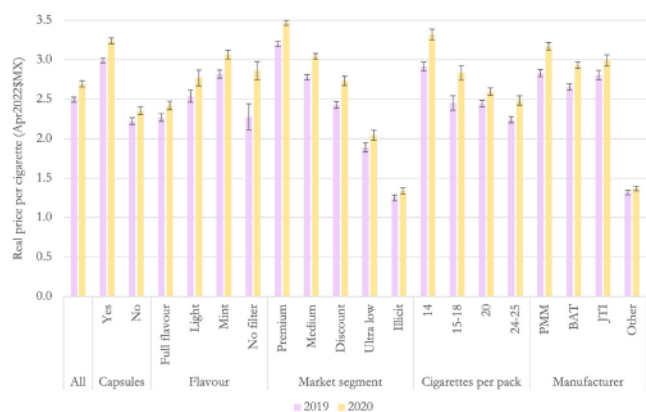


Figure 1 Cigarette prices in Mexico before and after the 2020 tax adjustment by selected attributes. Own estimates based on data licensed from NielsenIQ. Unweighted average prices. BAT, British American Tobacco; JTI, Japan Tobacco International; PMM, Philip Morris Mexico.

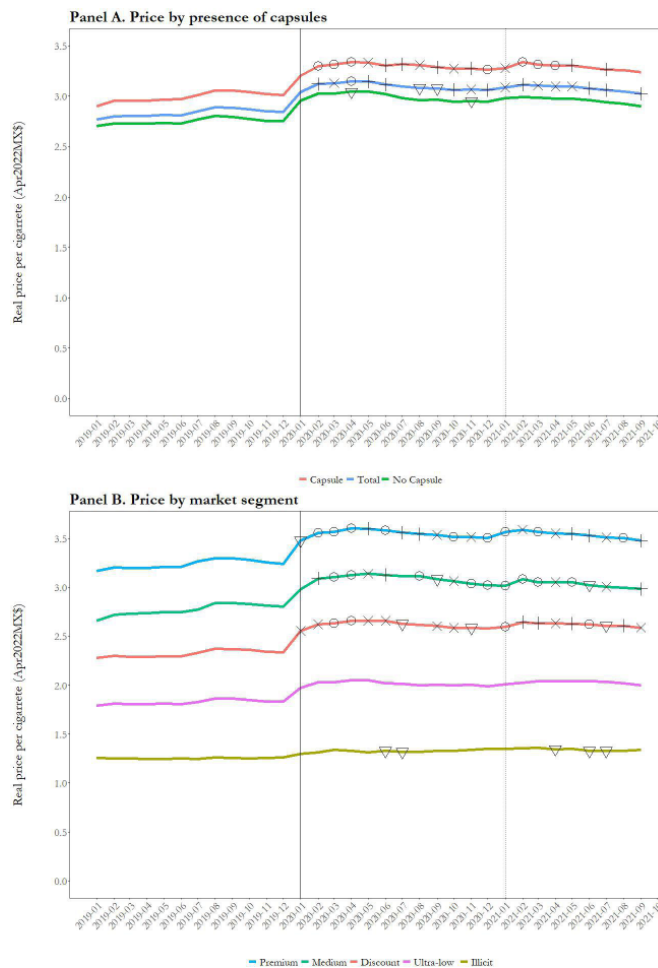


Figure 2 Trends in cigarette prices by capsule presence and market segment in Mexico, October 2018–September 2021 (vertical lines represent the entry into force of tobacco tax increases). Own estimates based on data licensed from NielsenIQ. Mean prices are weighted by monthly sales volume. Cross= $p<0.001$, \times = $p<0.01$, circle= $p<0.05$, inverted triangle= $p<0.10$ in t-test to compare differences between each month of 2020/2021 and the same month of 2019.

vs 6.2% and 11.0% for 20 and 24–25 cigarettes per pack) and PMM-produced (12.0% vs 10.4% for BAT and <10% for other-produced) cigarettes.

Figure 2 shows in greater detail price trends over the study period. In 2020, the tax adjustment is clearly associated with real price increases. These price changes, however, seem to have been implemented in the first 2 months of the year rather than immediately with the tax in January. In 2021, the real price remained constant after the tax adjustment. The disaggregated analysis by the presence of capsules (panel A) and market segment (panel B) exhibits similar trends, as observed for other attributes such as flavour, pack size and manufacturer (online supplemental figure A2).

Effects of tax adjustments on cigarette prices

Table 1 shows the results of the fixed effects models; only the coefficients that denote the price changes after the tax adjustments (β_1 and β_2) are included. In line with the descriptive analysis presented above, we observe a clear association between the year of implementation of the larger 2020 tax adjustment and price increases. On average, the real price per cigarette increased by Apr2022MX\$20.3 (\approx US\$1.16) cents in 2020 ($p<0.001$)

Table 1 Fixed effects models to estimate changes in cigarette prices after tax increases stratified by selected attributes

	Tax 2020	Tax 2021	n
	Coefficient β_1	Coefficient β_2	
All	0.203***	-0.014	5988
Capsules			
Yes	0.282***	-0.028	2231
No	0.156***	-0.004	3757
Flavour			
Full flavour	0.166***	-0.041	3054
Light	0.246***	0.091	791
Menthol	0.232***	-0.015	2066
Market segment			
Premium	0.277***	0.022	1550
Medium	0.204***	-0.021	1753
Discount	0.241***	-0.078	670
Ultra-low	0.157***	-0.003	1388
Illicit	0.061	-0.020	627
Cigarettes per pack			
14	0.181***	0.004	4315
15–18	0.261**	-0.029	378
20	0.271***	-0.110**	844
24–25	0.246***	0.018	438
Manufacturer			
PMM	0.285***	0.001	1995
BAT	0.198***	-0.047	2207
JTI	0.280***	-0.005	623
Other	0.031	0.019	1163

Own estimates based on data licensed from NielsenIQ. Each row corresponds to a model fitted separately; only the coefficients that denote the changes in prices after the tax adjustments are shown (β_1 , β_2). All models include a linear trend, a dummy variable for 2018, and fixed effects by product. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Due to few observations, unfiltered cigarettes and pack size < 14 are excluded. n=observations.
BAT, British American Tobacco; JTI, Japan Tobacco International; PMM, Philip Morris Mexico.

but remained constant in 2021 ($p > 0.05$). **Table 1** also explores heterogeneous price responses through disaggregated models by presence of capsules, flavour, market segment, pack size and manufacturer. In all cases—except for illicit brands and relatively small producers—the real price increase that followed the tax adjustment of 2020 is evident ($p < 0.001$). The 2021 minor tax adjustment, however, does not correspond to an additional real price increase and 20-cigarette packs present a reduction of 11 cents ($p > 0.01$) that partially offsets the increase in 2020.

Also consistent with **figure 2**, the specification with monthly dummies captures a gradual increase in real prices that took place throughout the first months of 2020 beyond January (column 1 of **table 2**, online supplemental figure A3). However, after a peak in April prices return to February levels, suggesting that the March–April increases may have been temporary in the context of the onset of the COVID-19 pandemic. Likewise, we observe that price increases were gradual for most cigarette categories (columns 2–8 of **table 2**, online supplemental figure A4); only illicit cigarettes do not register any price increase in either 2020 or 2021. In the case of discount and ultra-low-priced brands, their price exhibits a steep increase in January–February but then reverts towards the pretax trend that was already increasing. The price of mid-segment brands does not show a significant change in January, but the same pattern of gradual increase described

above begins in February. Pall Mall, the only brand with a significant increase in market share in the past decade,¹⁷ belongs to this price segment.

Online supplemental tables A2–A4 show the results of robustness checks. Point estimates from aggregate price models per month are larger, but generally consistent, whether or not lags were included to correct for autocorrelation (online supplemental table A2). Specifically, this model indicates a Apr2022MX\$23-cent increase in prices after the 2020 adjustment and no additional increase after the 2021 adjustment. Other robustness checks consisted of modelling the intervention from the moment of announcement (November 2019/2020) instead of the entry in force (January 2020/2021). However, the results indicate that price changes began with implementation as seen in **figure 2** (online supplemental table A3). We also employed a dynamic specification with a lag of price. In this case, the point estimate is slightly lower but within the margins from the main specification (online supplemental table A4).

Analysis of tax pass-through

In general, average observed prices are similar to expected prices with a full pass-through of the tax increases (**figure 3**; $p > 0.05$). However, there is evidence of over-shifting (between 2.5% and 16.9%; $p < 0.05$) of the 2020 tax for certain cigarette types, namely capsule (8 cents/cig), premium to discount (9–13 cents/cig), unfiltered cigarettes (41 cents/cig), pack sizes 14 to 18 (21 to 24 cents/cig) and PMM (17 cents/cig) and BAT-produced (11 cents/cig) cigarettes. This explains the reduction in the relative price of ultra-low-priced brands compared with discount brands from 0.78 (MX\$1.89/MX\$2.43) in 2019 to 0.75 (MX\$2.04/MX\$2.73) in 2020.

We only observe undershifting (–8.0% or –12 cents/cig) of the 2020 tax for cigarettes manufactured by companies other than the three main transnationals, which allocate their production to ultra-low (49.0%) and illicit (50.7%) segments. In fact, the drop in the relative price of the ultra-low segment is driven by these small producers. While transnational companies fully transferred the tax to their ultra-low brands ($p > 0.05$), small producers absorbed part of the tax to keep the price constant (–10 cents/cig or –6.2%; $p < 0.05$). In 2021, observed prices are generally the same as expected prices, indicating a 100% pass-through of the smaller tax adjustment to account for annual inflation.

DISCUSSION

This study provides a comprehensive analysis of the effect of recent excise tax increases on cigarette prices in Mexico. In general, we observe that after the tax increase of MX\$14.44 cents/cig implemented in early 2020, prices were raised during the first 2 months of the year. Compared with the evidence of price smoothing found in HICs,^{9 10} this pass-through of the tax was much faster, perhaps because the tax change was small. But to the extent that it was not a single price hike, it shows the ability of producers to temporarily cut their profits. Moreover, we found that prices increased somewhat more than expected for some cigarette types (capsule, unfiltered, premium to discount, low pack sizes and PMM and BAT-produced). However, over-shifting was not concentrated in premium brands as has been observed in other countries,⁴ but in all market segments except the ultra-low-priced, which reduced their relative price compared with discount brands. This overshift provides some evidence that the tobacco industry believed that some market segments could endure higher prices and that the tax increase could have been more aggressive. It is important to highlight that the current Mexican cigarette market differs substantially

Table 2 Alternative specification to allow for non-linear price changes after the 2020 tax increase

	Capsules			Market segment				
	All	Yes	No	Premium	Medium	Discount	Ultra-low	Illicit
	1	2	3	4	5	6	7	8
January 2020	0.114***	0.154***	0.090**	0.151**	0.073	0.242**	0.087*	0.020
February 2020	0.208***	0.284***	0.163***	0.293***	0.173**	0.209*	0.216***	0.070
March 2020	0.245***	0.320***	0.199***	0.319***	0.311***	0.261**	0.146**	0.079
April 2020	0.276***	0.383***	0.209***	0.407***	0.346***	0.251**	0.143**	0.088
May 2020	0.209***	0.298***	0.154***	0.254***	0.270***	0.181	0.176***	0.022
June 2020	0.223***	0.245***	0.209***	0.345***	0.229***	0.137	0.180***	0.084
July 2020	0.170***	0.221***	0.140***	0.254***	0.163*	0.119	0.133*	0.120
August 2020	0.191***	0.287***	0.133**	0.255***	0.294***	0.027	0.090	0.145
September 2020	0.178***	0.221***	0.153***	0.328***	0.214**	0.046	0.081	0.073
October 2020	0.207***	0.252***	0.177***	0.353***	0.240**	0.031	0.160**	0.045
November 2020	0.180***	0.191***	0.172***	0.264***	0.238**	0.069	0.110	0.084
December 2020	0.191***	0.220***	0.173***	0.261***	0.290***	0.071	0.110	0.064
2021	0.182***	0.205***	0.167***	0.324***	0.242**	-0.030	0.115	0.064
2018	-0.034	-0.062	-0.020	-0.138***	-0.004	0.021	0.019	-0.004
Trend	0.002	0.003	0.002	-0.003	0.002	0.013**	0.006*	-0.004
Constant	2.461***	2.930***	2.179***	3.231***	2.764***	2.305***	1.815***	1.350***
Observations	5988	2231	3757	1550	1753	670	1388	627
R ²	0.883	0.690	0.882	0.598	0.497	0.482	0.887	0.585

Own estimates based on Nielsen data for October 2018–September 2021. Each column corresponds to a model fitted separately. Fixed effects by product, ***p<0.001, **p<0.01, *p<0.05.

from 12 years ago: previous studies identified two well-defined segments, premium and discount, representing international and national brands, respectively.¹⁵ In contrast, two additional segments within the legal market are now clearly distinguished: a mid-priced and an ultra-low priced segment, which is consistent with the findings of another recent research study that described this reconfiguration in the second half of the last decade using different data.¹⁶ A closer examination of the ultra-low-priced segment indicates that small producers absorbing taxes to gain consumers drove the reduction in the relative price of ultra-low-priced cigarettes, not differential shifting across price tiers by transnational companies. The minor 2021 adjustment for annual inflation was fully passed onto consumers, keeping real prices constant.

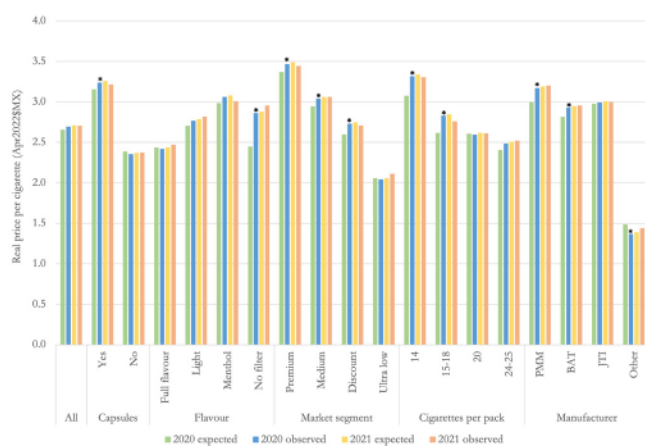


Figure 3 Observed average prices per cigarette vs expected prices with 100% pass-through of the 2020 and 2021 tobacco tax adjustments by selected attributes. Own estimates based on data licensed from NielsenIQ. Unweighted average prices. *p<0.05.

Capsule cigarettes, a rapidly growing segment,¹⁸ deserves special attention. Unlike non-capsule cigarettes, capsules exhibit a strategy involving two-stage price increases and overshifting that appears to take advantage of both the strong positioning of capsule cigarettes to maximise industry profits and the mitigating effects of gradual increases to minimise demand responses. This contrasts with the pricing strategy used during the introduction of the Pall Mall brand in Mexico, which popularised capsule variants.¹⁷ Previous research found that in a highly favourable context in which the government had committed not to increase taxes, this brand was introduced at discount prices in 2008, although its relative price gradually rose as its market share increased until it reached the medium segment in the second half of the 2010s.¹⁶ These findings on pricing strategies during tax adjustments add to what was previously observed in a context without tax changes, illustrating the ease of adaptation of the tobacco industry, and the need to consider these strategies when designing tobacco tax policy.

Strengthening fiscal policy in Mexico is essential as the decline in smoking prevalence has slowed.^{29–31} From 2002 to 2009, smoking prevalence decreased by 22.9%,²⁹ with tax increases accounting for nearly 60% of this reduction.^{32 33} However, between 2009 and 2023, only daily smoking fell by 14.1% (p<0.05), while overall smoking remained at about 16% (p>0.05).³⁴ Considering recent changes in Mexican legislation that implemented 100% smoke and emission-free environments and a total ban on advertisement, tobacco taxation is the policy farthest behind in Mexico.³⁵ Various studies indicate that substantial tobacco tax increases would have important health, financial and distributional effects,^{36–38} but our findings suggest policy implications. First, the emergence of an ultra-low-priced segment involving small producers willing to absorb fiscal adjustments provides opportunities for consumers to down trade. In 2023, a brand in this segment (Link) was among the top five sellers, comprising about 3%.³⁴ Measures to

counter this development could include adopting a fully specific tax structure or implementing minimum excise taxes as in the UK. Second, we found the price gap between licit and illicit cigarettes widened. Although the data used only capture a small fraction of Mexico's illicit market,²⁷ it is important to acknowledge that large tax increases could presumably influence illicit cigarette consumption, depending on relative price responses. Therefore, measures to control and prevent illicit trade should be considered.

In terms of limitations, we were unable to analyse price responses of loose cigarettes. Although the sale of single sticks has been prohibited for more than 20 years, it is a widespread practice in Mexico with almost half of adults who smoke reporting purchases of loose cigarettes rather than packs in 2023.³⁴ A previous study from Mexico that used self-reported price information found that prices for both cigarette packs and single sticks followed a similar pattern after the 2011 substantial tax increase.¹⁵ However, a recent study on a large tax increase implemented in 2017 in Colombia,¹³ where the sale of single sticks is also widespread, found a combination of overshifting for single sticks and undershifting for packs of the mid and premium segments. Future studies should explore whether pricing strategies differ for single sticks in Mexico, especially due to the important increase in this form of purchase. Second, the quasi-experimental approach used does not allow to distinguish other factors that could have influenced price changes, especially the COVID-19 pandemic, although trend patterns until 2021 suggest that the effects of the shock were temporary. Finally, due to limitations of the database, we were unable to explore other tobacco industry pricing strategies that have been primarily observed in HICs such as price discrimination. In addition, the lack of transparency regarding NielsenIQ's detailed sampling strategy and data collection procedures limit our ability to fully interrogate the data quality.

CONCLUSION

This study found evidence of two tobacco industry pricing strategies in response to the specific tax increase implemented in 2020 in Mexico: price smoothing and moderate overshifting. For capsule cigarettes, a rapidly growing segment in Mexico as in many other countries,^{18 24 25} we observed a combination of both strategies. The industry's ability to temporarily absorb the tax and raise prices beyond necessary suggests that the tax increase could have been larger. In fact, the tax increases analysed were minimal and merely compensated for the lack of adjustments to the specific tax for inflation between 2011 and 2020, leaving the tax burden well below WHO recommendations.¹⁹ A large, sudden tax increase is essential for overcoming the nearly 15-year stagnation in smoking prevalence in Mexico, but switching to a completely specific tax structure or minimum taxes should be considered to counteract some of the effects of industry pricing strategies.

Contributors All authors contributed to the original idea of this study. BSdMJ designed the study, performed data analysis and interpretation, and wrote the first draft of the paper, with significant input from KW. All authors contributed to the editing of the final version. The corresponding author, BSdMJ, stands as guarantor.

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ORCID iDs

Belen Saenz-de-Miera <http://orcid.org/0000-0003-3117-0734>
 Kevin Welding <http://orcid.org/0000-0002-1833-6691>
 Tuo-Yen Tseng <http://orcid.org/0000-0002-5634-3374>
 Grazielle Grilo <http://orcid.org/0000-0002-8377-4794>
 Joanna E Cohen <http://orcid.org/0000-0002-3869-3637>

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