Evidence on Alcohol Taxation and Public Policy in Mexico

I. Background

Alcohol use is associated with **more than 200 health conditions**, including various types of **cancer**, heart disease, cirrhosis, diabetes, epilepsy, digestive disorders, unintentional injuries, road traffic accidents, poisoning, falls, fires (WHO, 2018), and fetal impairment, along with other social consequences such as **violence, vandalism, criminality, and reduced productivity.** These health and social consequences associated with alcohol use result in **losses of at least 2.6 percent of GDP annually** in both middle- and high-income countries, including health care, criminal justice costs and losses in productivity (Manthey et al. 2021, cited in Solovei et al., 2022).[1]

Worldwide, **alcohol consumption killed 2.44 million people in 2019.** Men account for 2.07 million deaths attributable to alcohol consumption, while 0.37 million are women (GBD, 2019).

Additionally, binge drinking,[2] especially **among young people**, can have consequences including **loss of memory**, increased risk of falling victim to **physical or sexual assault, falls, becoming involved in fights, workplace and school absenteeism, legal problems, risky sexual practices, consumption of other drugs, alcohol dependence, and sadness or depression** (Villatoro et al., 2023).

Globally, 39.5 percent of the population over 15 years of age has engaged in binge drinking, including 45.7 percent of those aged 15–19 and 48.5 percent of those

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[1] Globally, 43 percent of the population over the age of 15 (just over 2 billion individuals) has drunk alcohol at least once in the past year. Annual per capita consumption of pure alcohol stands at 15.1 liters; alcohol is first consumed before the age of 15 and is a gateway drug for the consumption of other, illegal substances (Villatoro et al., 2023).

[2] Binge drinking is defined as having consumed, on a single occasion, 4 or more drinks for women and 5 or more drinks for men in the previous 30 days (or having drunk 60 grams or more of pure alcohol on a single occasion in the previous month) (Villatoro et al., 2023).

aged 20–24. Lower-income groups are most likely to engage in binge drinking (45.4 percent, versus 38.7 percent among higher-income groups).

In Latin America, alcohol use among the population aged 12–65 is greatest in Argentina and Uruguay, with percentages close to 52 percent, while the rates are much lower in El Salvador and Ecuador, at just 9.5 percent and 13 percent, respectively. (Villatoro et al., 2023).

In Mexico in 2016, Reséndiz et al. (2018) found that prevalence of lifetime use of alcohol among the youth population (ages 12–17) was 39.8 percent, while past-year use was 28.0 percent and past-month use was 16.1 percent. From 2011 to 2016, rates of binge drinking in the last month among youth rose from 4.3 percent to 8.3 percent, and daily use increased from 0.2 percent to 2.6 percent.[3]

As for the adult population (ages 18–65) in Mexico, prevalence of lifetime alcohol use as of 2016 was 77.3 percent, while past-year use was 53.3 percent and past-month use was 39.9 percent. Binge drinking among adults also grew significantly from 2011 to 2016, increasing from 13.9 percent to 22.1 for past-month binge drinking, from 6.3 percent to 9.3 percent for weekly binge drinking, and from 0.9 percent to 3.0 percent for daily binge drinking (Reséndiz et al., 2018).

According to data by Ramírez et al. (2023), the lifetime **prevalence of alcohol consumption in the adolescent population** (ages 10–19) in Mexico **is 20.6 percent** (22.0 percent for males and 19.2 percent for females). Within this population, 13.9 percent engaged in binge drinking in the last 12 months (15.0 percent for males and 12.7 percent for females), while past 30-day binge-drinking prevalence was 5.2 percent (6.1 percent for males and 4.2 percent for females).

In the adult population of Mexico, the lifetime prevalence of alcohol consumption is 55.5 percent, with a higher rate among men (67.3 percent) than

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[3] "Past-month binge drinking" refers to people who have consumed in the past month five or more drinks on a single occasion in the case of men or four or more drinks on a single occasion for women. In the case of weekly binge drinking, it refers to people who have consumed once a week five or more drinks on a single occasion in the case of men or four or more drinks on a single occasion for women (Reséndiz et al., 2018).

women (44.6 percent). Among adults, 40.4 percent engaged in binge drinking in the last 12 months (53.3 percent of men and 28.4 percent of women), while past-month binge-drinking prevalence was 19.1 percent (28.8 percent of men and 10.1 percent of women) (Ramírez et al., 2023).

A recent simulation by the Organisation for Economic Co-operation and Development (OECD, 2021) estimates that **life expectancy** in Mexico over the next 30 years **will be one year lower across the entire population** due to the effect of women consuming more than one drink a day and men consuming more than one and a half drinks per day.

This paper **reviews evidence on alcohol taxation and public policy in Mexico** and presents research findings on the impacts of taxation on alcoholic beverages in Mexico as well as other measures aimed at reducing alcohol consumption.

For the most part, **these studies were drawn from a matrix developed by Tobacconomics**[4] and focus primarily on examining how consumers change their behavior in response to tax increases and the impact of such tax increases on revenue, health, tax incidence, tax evasion and avoidance in the sector, illicit trade, and alcohol outlet availability. Also included in the Appendix is a **summary table with the different price elasticities of demand** of alcohol beverages to facilitate comparison of the findings of the various studies.

II.   Relevant questions

1. *How do consumers change their consumption of alcoholic beverages in response to increases in tax on alcohol and other measures?*

Key messages: Mexican consumers drink less alcohol when prices increase.

Taxation can be an effective tool for curbing alcohol use and its harmful consequences.

Ameida (1999) conducted research into the price elasticities and cross-price

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[4] See https://tobacconomics.org/research/alcohol-evidence-matrix-mexico/.

elasticities of different alcoholic beverages (beer, tequila, and other spirits) and found that, in general, the **magnitudes of the estimated elasticities** for each good **are relatively low**, supporting the **possibility of raising the prices of these goods through corrective taxation** that counterbalances the externalities associated with drinking.

A study by Catalán and Moreno (2016) found that in the **short term**, a **marginal increase of one percent in beer prices only reduces demand by 0.25 percent**, whereas applying the same increase to **wines and spirits** achieves a demand **reduction of 0.58 percent**. In the long term, however, this marginal price increase reduces demand for beer by 1.23 percent and demand for wines and spirits by 1.48 percent. Over the long term, demand is thus elastic.[5]

A review of **income elasticity** by Catalán and Moreno (2016) found that a **marginal increase of one percent** in income leads to a **0.61 percent increase in demand for beer, but a 1.08 percent increase in demand for wines and spirits in the short term**. Meanwhile, **long-term demand increases by 3.04 percent for beer and 2.75 percent for wines and spirits**, reflecting high elasticity in both cases.

In addition, a comparison between beer prices and apparent domestic consumption per capita conducted by Guerrero-López et al. (2013) found that **increases in consumption** in the previous decade **coincide with falls in prices** and that recent drops in consumption are associated with price increases. This led the authors to conclude that **an increase in tax on alcohol may prove to be an important tool in lowering consumption**. They also raise the suggestion that tax policy should take into account adjustments for inflation in the amounts levied, while also prohibiting promotional pricing and introducing effective measures to combat tax

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[5] For beer consumption, the authors found that consumers prefer present consumption and obtained a time preference of 1.64, meaning that consumers are more likely to sacrifice future units of beer consumption in favor of present consumption. The authors note that this is dangerous because beer consumption is given priority over other goods and is not as elastic to changes in price. Meanwhile, wines and spirits yielded a time preference of 0.42, indicating that consumers place greater value on future consumption than present consumption. This makes consumers of wines and spirits more sensitive to price changes and more likely to reduce their present consumption in order to maintain future consumption. Changes in prices had a small impact in reducing short-term demand but a greater impact over the long term. Catalán and Moreno (2016) stress that alcohol pricing policies are not that effective and alternatives should be found to reduce alcohol consumption.

evasion and illicit trade.

Separately, Huesca et al. (2019) used data from the 2016 National Survey of Household Income and Expenditure (ENIGH) to identify different household responses to rates of IEPS excise tax levied on alcoholic beverages in Mexico. The data were analyzed by income quintile, drawing a distinction between northern (wealthier) border states and the rest of the country. Broadly speaking, their research highlights **the relevance of levying excise taxes to correct for negative externalities** and the need to allocate IEPS revenue to address these externalities in poorer households. It was also found that in the border region families spend an average of seven percent of their income on alcohol, compared to six percent in the rest of the country.

In addition, poor households are more responsive to taxes than wealthier ones. **For the lowest income quintile**, it was estimated that a **10-percent increase in alcohol prices** would result in a drop in consumption of 3.0 percent in the border region and 3.4 percent in the rest of the country. Wealthier families, meanwhile, would reduce their consumption by 1.8 percent in border states and 1.2 percent elsewhere. Thus, these taxes have a greater corrective effect within poorer households.

A study by Moreno-Aguilar et al. (2021) on beer consumption in Mexico found an elastic response to price variations: increases in beer prices result in a proportionally greater reduction in the quantity demanded. In particular, a **one-percent increase in the price of beer leads to a drop in consumption of 1.31 percent in the short term and 1.40 percent in the long term.**[6]

Other studies have explored cross-price elasticity, on the basis that increases in the price of tobacco and soft drinks have an impact on demand for alcohol. Huesca et al. (2021) found low cross-price elasticity between alcohol and tobacco. A 10-

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[6] Similarly, Urzúa (2013) found that given a 1.0 percent increase in the price of beer, consumption in urban households would fall by 1.082 percent, and by 1.462 percent in rural households.

percent change in cigarette prices reduces consumption of tobacco by 7.57 percent and that of alcohol by 0.22 percent. **A 10-percent increase in the price of alcohol reduces alcohol consumption by 7.7 percent.** A 10-percent increase in the price of soft drinks results in a 1.09-percent decrease in quantity of alcohol demanded. These findings lead the authors to recommend that any increase in taxation of these goods be applied simultaneously to bring about sharper decreases in consumption levels.

A study carried out by Martínez (et al., 2023) found a price elasticity of demand for beer of -2.36 and an income elasticity of demand for the same product of 5.04. The study concludes that a fiscal policy must be implemented with the purpose of reducing beer consumption in the country.

For authors like Solovei et al. (2022), **alcohol taxation is not the only effective measure**. Other approaches like screening, brief intervention, and referral to treatment (**SBIRT**) are effective strategies to reduce a population's alcohol consumption. In Mexico, it was found that a 10-year implementation of this program would yield positive returns on investment of between 21 percent and 110 percent due to decreases in health care expenditure, while averting more than 16,000 alcohol-related deaths.

One further measure has been proposed by López Olmedo et al. (2023), who conducted an experiment in 11 Mexican states to test the potential impact of including **labels on alcoholic drinks warning of the health risks** associated with consumption. Their research concludes that using these types of warnings can lead people to think of the potential harm caused by alcohol, lessen the appeal of these products, and reduce purchase and consumption intention.

2. What impact does an increase in alcohol tax have on revenue, consumption, and health?

Key messages: Increases in tax are associated with higher revenue.

Higher taxes result in higher prices, reducing consumption of alcohol and limiting its harm to health.

The best-performing interventions include a combination of taxation; brief interventions; advertising control; reduced availability, business hours and outlet density; and responsible retailing.

A study by Medina-Mora et al. (2010) assessed the following seven alcohol-abuse-control scenarios: 1) maintaining the status quo, 2) a 25-percent increase in consumption taxes, 3) a 50-percent increase in consumption taxes on high-proof alcohol products, 4) reduced availability of high-proof alcohol products, 5) regulation of associated advertising, 6) brief preventive and persuasive interventions at the primary level of care, and 7) random testing for motorists (breathalyzer tests). The research found that **all tax-based interventions resulted in more than 150,000 disability-adjusted life years (DALYs) averted each year.** Increasing taxes was the most cost-effective measure, but the best results were obtained by **combining tax increases with delivering brief interventions to a greater proportion of individuals, advertising control, and reduced availability achieved through measures concerning an increase in minimum customer age, reducing business hours and outlet density, and responsible retailing.**

In a study of 2019 figures in Mexico, Rodríguez and Foncerrada (2022) report that switching from an *ad valorem* to an *ad quantum*[7] system would increase revenue by ten billion pesos (from 15 billion to 25 billion pesos), reduce loss from tax evasion and illegal practices by 8.5 billion pesos, and simplify tax collection.[8]

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[7] In general, taxes on alcoholic beverages are applied in two ways. Ad-Valorem taxes are charged on the value of the product; that is, a fee is applied to the price. While Ad-Quantum taxes consider the amount of alcohol contained in the product, for which a fee is charged.
[8] Anderson (2020) notes that ad valorem taxes, variable by type of alcohol, tend to be progressive due to the fact that "premium" beverages are mostly consumed by wealthier individuals. At the same time, in wine-producing countries, these taxes may incentivize wine exports.

Meanwhile, Rendón et al. (2022) note that **ad valorem** taxes boost the production and consumption of high-proof, low-quality beverages, since lower prices encourage consumption. **Ad quantum taxes, on the other hand, generate more revenue and encourage production of higher-quality beverages with lower alcohol content**, as higher prices produce the opposite effect. The authors point out that taxes levied on beer in Mexico have not succeeded in reducing beer affordability, and the **IEPS excise tax does not curb the acquisition of alcoholic beverages by children, adolescents, and young adults and has instead provided an incentive for smuggling and the production of counterfeit and adulterated beverages.**

3. To what extent are the poor affected by increases in tax on alcoholic beverages?

Key messages: Taxes on alcoholic beverages are progressive.

Poorer households tend to be more responsive to changes in price.

Mexico's Center for the Study of Public Finances (CEFP, 2018) has reported that **taxes on alcoholic beverages are progressive**[9] because it is the highest-income deciles that contribute most. In 2016, the top-earning 30 percent of households contributed 61.8 percent of IEPS on beer, for example. However, the **progressivity of this tax has declined since 2014**, with the share of contributions from the top-earning quintile falling from 54.3 percent to 47.9 percent, while the contribution from the lowest-earning quintile rose from 2.2 percent to 4.2 percent. As for IEPS on alcoholic beverages in general, the contribution from the top-earning quintile fell from 83.4 percent in 2014 to 75.3 percent in 2016, while the share borne by the lowest-earning quintile remained stable at 1.6 percent.[10] The CEFP (2018) also reports that beer is consumed by 75.8 percent of the population yet is subject to a

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[9] A fiscal system, or in this case a tax, is considered progressive when more tax is taken from those who have more and, in terms of public spending, when it benefits those who have less (CIEP, 2017).

[10] These results are consistent with other studies that report an income elasticity of beer consumption that is less than one. When income increases, beer consumption is maintained and a substitution effect is observed towards other higher-value beverages, increasing the amount of tax paid. In the same vein, Anderson (2020) notes that taxes on premium alcohol products tend to be progressive, given that wealthier households have a greater propensity to consume these types of products.

lower tax rate than other alcoholic beverages, which may justify a call for a reorientation of fiscal policy. In contrast, only 23.7 percent of the population drink wines and spirits, which are subject to a higher rate of tax.

Similarly, Medina-Mora et al. (2010) note that, according to international consultants, the top 30 percent of earners drink 53 percent of the available alcohol. According to INEGI, however, **spending on alcohol is higher among the poorer population when considered as a proportion of income, so any price increase could have a greater impact on lower-income groups.**[11] Therefore, lower-income groups can benefit from a greater reduction in consumption.

Urzúa (2013) argues that **changes in the price of beer have a greater impact on rural households than urban ones** and presents elasticity calculations that suggest that beer is a luxury good for both sectors.

Furthermore, Villatoro et al. (2012) report that 25.5 percent of the Mexican population lives in rural communities with 2,500 or fewer residents. **States with larger rural populations also have a lower life expectancy, higher illiteracy rates, lower per capita income, lower levels of schooling, and a lower human development index score.** Alcohol consumption in rural areas is lower than in urban areas, although the age at which individuals start drinking is very similar. However, despite lower levels of consumption in rural areas, liver cirrhosis mortality remains very high; this may be linked to the consumption of pulque, more common in rural areas and generally unrecorded.[12]

By calculating price elasticities of demand, quality elasticities, and income elasticities, Nicita (2008) found that the **poorest households tend to be more responsive to price variations.** His results show that lowering tax on corn,

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[11] Medina-Mora (2000) points to five features that characterize drinking culture in Mexico: 1) daily alcohol consumption is uncommon; 2) drinking most commonly occurs at parties, often to the point of drunkenness; 3) access to alcohol is not equal across the whole population; women are mostly excluded, and occasional drunkenness is more socially acceptable in men than in women; 4) norms state who may drink but do not encourage moderation; and 5) there is a high level of problems derived from acute intoxication, like accidents or chronic diseases like cirrhosis.

[12] Gutiérrez (2000) notes that per capita alcohol consumption is underestimated in Mexico, as it does not include unrecorded consumption, estimated to account for between 34 percent and 40 percent of the total volume consumed by the poorest sector of society.

alcoholic beverages, and vegetables would be most equitable and efficient in terms of social benefit, while lowering tax on vegetables, sugar, and oils and fat would be inefficient but would help to reduce inequality. Each household's response is dependent on its income level; poorer households have higher income elasticities. It is fairly likely, however, that the differences between rural and urban areas are caused by differences in income rather than differences in household behavior parameters.[13]

Finally, according to Rodríguez and Foncerrada (2022), in Mexico, the **burden of paying taxes on alcoholic beverages on an ad quantum basis**, rather than the ad valorem system currently in place, **would fall on higher-income deciles.[14]**

4. *What are the economic impacts of the harm to health caused by excessive drinking, and how can fiscal policy reduce these costs?*

> **Key messages:** Diseases and other consequences of excessive drinking will cost Mexico 1.4 percent of its GDP in 2050.
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> As well as helping to reduce consumption, tax policy can also generate some of the funding needed to tackle the problems caused by alcohol use.

According to the OECD (2021), **alcohol consumption is responsible for a large number of diseases and conditions that are ultimately treated by public or private health care institutions**, the most expensive of which, in OECD countries, are 1) alcohol **dependence**, 2) alcohol-related **cancers**, 3) **cirrhosis**, 4) **diabetes**, 5) **injuries**, and 6) **mental health** conditions. Alcohol consumption in excess of one drink a day for women, or 1.5 drinks a day for men, **decreases employment** by 0.33 percent a year across all OECD countries and results in an average reduction in the overall workforce of 0.62 percent and a **1.6 percent decrease in GDP** annually (OECD, 2021).

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[13] Medina-Mora (2000) finds that the risk of consuming wine and aguardiente is greater among people who do not work, while the risk of drinking beer and spirits is greater among the working population. Level of education only predicts consumption of alcohol; the greater the level of education, the more likely people are to drink wine.
[14] These authors propose a tax of 106 pesos per liter of pure alcohol and find that this measure would reduce consumption of beverages most harmful to health and enable the generation of more tax revenue. They also find that the highest deciles would bear the brunt of this tax, leading them to argue that the measure would be progressive.

Colchero et al. (2022) caution that there are serious consequences to alcohol use, including **road traffic accidents and an increase in violence**. In 2016 alone, there were more than 49,000 alcohol-related deaths in Mexico, including those associated with conditions like **psychosis and cirrhosis, among many others.[15]**

Additionally, the OECD (2021) reports that **excessive alcohol consumption costs Mexico 0.4 percent of its GDP annually and affects workforce productivity**. This will result in a 1.4-percent reduction in real GDP by 2050, **requiring the country to increase tax revenue by 272 pesos per capita per year**. Meanwhile, for every peso invested in the recommended policies, 16 pesos are returned in benefits (excluding the impact on the alcohol industry). Additionally, investing 19.3 pesos per person per year in the policy package will save 1.7 billion pesos in health care expenditure and would prevent 4.2 million cases of noncommunicable diseases and injuries by 2050.

Urquieta et al. (2006) warn that alcohol abuse in Mexico is the cause of such scourges as **liver cirrhosis, road traffic injuries, alcohol dependence, and homicide**. Medina-Mora (2000) also notes that **cirrhosis (highly associated with alcohol consumption) is one of the top ten causes of death in the Mexican population and the most common cause of death in men aged 35 to 54 years.**

Based on a survey of 564 students between the ages of 12 and 17 in Mexico, Ringwalt et al. (2020) found that **alcohol-related injuries were associated with the availability of alcohol for off-premises consumption.**

Meanwhile, Goméz-García et al. (2023) report a **prevalence of past-30-day suicidal ideation (SI) in Mexico of 17 percent** (18.8 percent for women and 14.4 percent for men), **and this figure is higher among groups who reported** having been diagnosed with depression (55.9 percent), being victims of violence (42.1 percent), using drugs (53.7 percent), being unemployed (30.5 percent), and **binge**

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[15] Binge drinking can have economic and health impacts. Santoyo-Castillo et al. (2017) report that from 2010 to 2013, approximately 19.5 percent of all road traffic deaths in Mexico were alcohol-related.

drinking (28.7 percent), among other factors. Similarly, the authors also found that adolescents who are heavy drinkers are 9.7 times more likely to experience SI.

According to the CEFP (2018), in 2018 **the budget for the program Addiction Prevention and Treatment (*Prevención y Atención contra las Adicciones*) stood at just four percent of IEPS revenue from beer** and one percent of total IEPS revenue from alcoholic beverages, suggesting there is space to earmark more funds for public programs aimed at reducing alcohol and other drug use.

5. *How does the tax increase affect employment and growth in the alcohol industry and in the wider economy?*

Key messages: The alcohol industry is one of the country's largest, with extensive production chains and job creation capacity.

It is important that any fiscal policy design is well adapted to this particular industry, with tax increases that have minimal or no negative impacts on variables like employment.

According to data from INEGI (2020), beer production represents 65 percent of gross production of alcoholic beverages in Mexico and employs 49.3 percent of workers in the sector. Beer production also accounts for 0.5 percent of manufacturing industry production (versus oil refining at 3.9 percent, for example). From 2013 to 2019, production in the sector grew by 6.7 percent a year and, although production was halted during the pandemic, it quickly recovered to pre-lockdown levels by June 2020. All in all, 73 percent of inputs in the brewing industry are sourced domestically (compared to the manufacturing industry average of 42.1 percent). The brewing industry has an economic spillover on 168 business activities, chiefly in commerce and services, and employs an average of 117 workers per economic unit (enterprise) (versus the manufacturing industry and economy-wide averages of 11 and 6, respectively). Average monthly pay in the industry is 34,900 pesos (the highest in the sector) and Mexico is the world's leading exporter of beer. Per capita consumption in 2019 stood at 68 liters per person per year.

According to INEGI (2019), 181 municipalities in five states, home to 10,493,356 inhabitants, are covered by the designation of origin (*denominación de origen*) status for tequila. As for mezcal, 963 municipalities in nine states, home to a population of 17,806,184, are protected by a designation of origin status.

INEGI (2019) reports that **64 percent of all economic units in the alcoholic beverage industry produce tequila and mezcal, 6.2 percent beer, 5.6 percent wines, and 3.6 percent cane spirits**. Similarly, for every 100 pesos spent on alcoholic beverages, 18.6 goes to agave spirits (tequila and mezcal), the second largest industry in the Mexican alcoholic beverage market in terms of production. Additionally, tequila represents 87 percent of the value of production of agave spirit drinks, with mezcal making up the remaining 13 percent. The mezcal and tequila industries impact 143 business activities, with inputs sourced from business activities including the cultivation of agave plants for alcohol (41 percent of all inputs), the supply of full-time staff (nine percent of all inputs), and manufacturing of glass bottles of various sizes (8.5 percent of all inputs).

The CEFP (2018) reported that from 2000 to 2017 production of beer and other alcoholic beverages grew by an average of 3.5 percent per year. At the same time, in 2016, Mexico accounted for 21.3 percent of global beer exports. The study finds that **in 2017, the alcoholic beverage industry employed 21,285 workers** directly and 85,000 indirectly. **Beer production represents 63 percent of direct jobs in the alcoholic beverage industry.**

According to Anderson (2020), alcohol taxes (import tariffs, IEPS or similar taxes, and VAT) are lower, in relative terms, on wine than on beer, and lower still on spirits. It has also been observed that, on average (in a sample of 42 countries), taxes on alcoholic beverages make up 50 percent of the retail price of beer and wine, and approximately 112 percent in the case of spirits. However, varying levels of taxation were observed between countries in the sample. This points to the existence of **stakeholder lobbying in the application of this public policy.**

6. Does raising taxes on alcoholic beverages lead to an increase in tax evasion and avoidance and the consumption of unrecorded or illicit alcohol?

Key messages: In a context of weak rule of law, a heavy tax burden can encourage tax evasion and avoidance and the production of counterfeit beverages.[16]

To combat corruption and strengthen tax collection systems, measures like requiring verifiable electronic tax labels (marbetes) should be maintained.

Two out of five bottles of spirits are unrecorded. [17]

A study by Cerveceros de México (2018), an alcohol-industry organization, reports **a relationship between illegal alcohol and high tax rates. They find that a heavy tax burden on alcoholic drinks is sufficient to encourage tax evasion** in the distribution chain.[18] Furthermore, restaurants and bars are among the main drivers of trade of unrecorded alcohol as they endeavor to keep prices low and increase profit by procuring illicit alcohol or refilling bottles. **Spirits are most heavily affected, accounting for 98 percent of illegal alcohol**, due to the fact that spirits are more highly priced and used in mixed drinks, making it harder to tell the difference (levels of illegal beer are low).

The Cerveceros de México organization maintains that one of the main reasons why legal producers evade tax is because they believe the end product is too expensive, leaving them with little profit. Therefore, they aim to keep prices low by evading taxes and, in doing so, make more profit. The alcohol-industry sponsored study found that **raising taxes on alcoholic beverages leads to increases in tax evasion and avoidance and in the consumption of unrecorded or illicit alcohol,** as consumers are drawn towards cheaper products and producers and

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[16] Tax evasion refers to using illegal means to avoid paying taxes (https://www.law.cornell.edu/wex/tax_evasion). Meanwhile tax avoidance refers to an action or actions taken to lessen tax liability and maximize after-tax income (https://apps.irs.gov/app/understandingTaxes/whys/thm01/les03/media/ws_ans_thm01_les03.pdf).

[17] It is worthy to say that limited non-alcohol industry studies have been conducted, which makes it difficult to assess the true levels or trends in illicit consumption.

[18] It should be noted that these findings are based on conclusions drawn by the alcohol industry and must therefore be considered with caution, as they stand to benefit from lower alcohol taxes.

retailers seek to maximize profits.[19] The illegal market has become more sophisticated due to small-scale production and the sale of lower-quality beverages that appear to be legitimate, with labels and other features that are very similar to the original versions.

According to Medina-Mora et al. (2010), a tax increase can spur growth in the informal alcohol market, so any such measure should not be introduced without targeted strategies aimed at reducing the volume of untaxed alcoholic beverages. An earlier report by the same author found that **for every five bottles of alcohol consumed, two were not recorded** (Medina Mora, 2000).

In a similar vein, a study by Euromonitor Consulting (2021),[15] another industry group, found that the economic downturn and restrictions imposed on the purchase of alcohol during the COVID-19 pandemic provided the ideal conditions for the growth of the informal market. Although overall consumption of alcoholic beverages fell by 7.0 percent in 2020, off-trade sales increased by 10.9 percent.[20] Indeed, the **informal market came to account for as much as 42.5 percent of all purchases of distilled alcoholic beverages**, mainly due to sales in open-air markets and on social networks and the closure of formal businesses. This translates to a **loss in revenue of more than 11.5 billion pesos.**

The same report by Euromonitor Consulting (2021) explains that consumers and establishments seek out **informal markets** due to an increase in the prices of alcoholic beverages, prioritizing price over quality, especially in the case of spirits. Other factors like **rising crime** (extortion) have also affected sales in formal establishments. Meanwhile, **open-air markets and clandestine bars** that hitherto only sold beer **have diversified their business** to include mojitos or clericots, using spirits and wines.

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[19] Again, these are conclusions drawn by the alcohol industry and need to be considered with caution due to potential conflicts of interest.

[20] In the beverage industry "on-trade" refers to places where beverages are sold for immediate consumption (such as bars, restaurants, and pubs). "Off-trade" refers to places like liquor stores, supermarkets and other places where beverages are not consumed right away (https://www.sharpgrid.com/ontrade-insights-eng/on-trade-vs-off-trade-whats-the-difference#:~:text=The%20on%2Dtrade%20refers%20to,consume%20the%20beverage%20right%20away).

7. How is retail availability of alcohol associated with consumption?

Key messages: Availability and low prices are associated with high consumption of alcoholic beverages.

Other aspects related to availability such as family alcohol use, cultural and religious factors, education, and institutional weakness must also be considered.

Two major factors in youth alcohol consumption are **easy accessibility and low prices**, according to Colchero et al. (2022). Emphasizing the importance of ease of accessibility, their study highlights the existence of **illegal businesses** that do not usually request any form of identification to check if consumers are of legal age, which makes them especially appealing to young people. Often, these places can be found in open-air or street markets, where they sell cocktails or mixes like gomichelas, frutichelas, micheladas, cahuamoles, mojitos, and vampiros (Rendón Cárdenas & Martín del Campo Sánchez, 2022).

Based on a survey of 564 students aged 12–17 in Mexico, Ringwalt et al. (2020) found a **positive correlation between past 30-day regular and excessive drinking and the perceived availability of alcohol and ability to procure alcohol.** In this sense, the authors highlight the importance of applying measures that reduce availability of alcohol for on-premise or off-premise consumption by minors.

Likewise, Lozano et al. (2023) found that **reducing availability** by introducing business compliance checks for underage sales, together with training and penalties, **led to a 16.4-percent drop in acute alcohol intoxication among youth**. They conclude that there is a **correlation between accessibility of alcohol outlets and alcohol consumption by minors** (Lozano Morales et al., 2020).[21]

Medina-Mora et al. (2010) report that after raising taxes, the **second-most**

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[21] Other factors also have a significant impact on the amount of alcohol consumed, such as level of education, income, gender, social security, population density, occupation, religion, and age (Catalán & Moreno, 2016).

effective measure is to reduce supply. However, an existing measure limiting the proximity of alcohol sales to schools and workplaces is poorly enforced. Ensuring compliance with bans on selling alcohol to minors, or at given times, or on given days is difficult in Mexico. Furthermore, the **authority to grant licenses and alcohol sales permits to businesses lies with municipalities**, leading the authors to suggest educating authorities on the indirect costs of alcohol that affect them, including accidents and productivity losses arising from harmful alcohol use.

By contrast, Paraje and Pincheira (2018) report that the period from January 2007 to March 2016 saw a **1.18-percent reduction in beer consumption in Mexico**, and they believe that **beer has become less affordable** for the Mexican population given income levels. However, the authors **did not find a direct relationship between alcohol retail availability and alcohol use**.[22]

The issue of drinking in families warrants particular attention. Mondragón et al. (2022) explain that **in Mexico there is intergenerational transmission of alcohol use**. They found that adolescents whose parents have drinking problems start drinking at an earlier age, in larger amounts, and more frequently. Similarly, these adolescents report more cases of alcohol poisoning and develop problems with managing their drinking more frequently than their counterparts.[23] The authors' results show that **young people who report that their mother or both parents have drinking problems are twice as likely to engage in binge drinking** than those who report neither parent having problems with alcohol abuse. Those who report that only their father has drinking problems are 35 percent more likely to engage in binge drinking.

Rendón et al. (2022) note that young people in Mexico **drink alcohol in homes, at bars, at house parties, and in school** (particularly students in the afternoon class

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[22] Romero (2016) notes that exclusivity in the beer market reduces the amount consumed, due to the fact that just two percent of beer consumed in Mexico between 2003 and 2012 was imported. This results in a more limited range of beer available, and reduced outlet availability, resulting in fewer drinking options.

[23] By analyzing data from the National Survey on Student Drug Use (ENCODE), the authors seek to determine the possible impact of parental alcohol consumption on young people. It was found that 10.6 percent of young people in the sample felt that their father had drinking problems; 1.3 percent, their mother; and 1.3 percent, both parents.

session), but also in **stores and informal businesses, at street markets and local social events** (both in rural and urban areas), **and even at religious celebrations**, where no checks are made by community or public health authorities to prevent the sale or serving of alcoholic beverages to minors.

In a separate study, Vázquez et al. (2020) designed a machine learning model to determine **which factors contribute most to lifetime consumption** of different substances (alcohol, tobacco, marijuana, and inhalants) in childhood (5th and 6th grades). It was found that prevalence of lifetime consumption of alcohol in Mexican children is 16.9 percent, compared to 9.2 percent in the United States of America. The most relevant predictors of lifetime use of alcohol in childhood are **friends' alcohol use, sex** (males were more likely to drink), father's alcohol use, and perceived risk of frequent alcohol use.

Villatoro et al. (2023) explored the relationship between alcoholic beverage availability and binge drinking to determine whether higher outlet density and the proximity of alcohol outlets to homes or schools predict a greater risk of alcohol use. They assert that **action is needed to enact and enforce regulations in relation to alcohol availability, limits on hours of sale, the minimum age to purchase or consume alcoholic beverages, and the reduction of density of places where alcohol can be sold or consumed** as effective measures to prevent and control alcohol-related noncommunicable diseases.

Additionally, Villatoro et al. (2023) note that **data from the 2016 National Survey on Drug, Alcohol, and Tobacco Consumption (ENCODAT) show that medium and high levels of alcohol accessibility are associated with increased risk of binge drinking**, with men reporting a greater risk than women. A greater risk of binge drinking is also observed among those with lower secondary education or higher, compared to those who only have primary schooling, and among individuals earning more than three times the minimum wage compared to those earning less than twice the minimum wage. **A greater risk of binge drinking is also found in rural populations.**

Villatoro et al. (2023) also point out that, since the COVID-19 pandemic, sales have been made **digitally with home delivery, raising new issues in evaluating alcohol availability and consumption**. This aspect should be taken into account to set policies to regulate online sales and guarantee that products are delivered only to consumers of legal age.[24] This should go hand in hand with an analysis and update of relevant legislation, in line with the SAFER proposals (explained on pages 19 and 20).

Hernández-Llanes et al. (2019) assert that **underage drinking is a public health problem** and policies aimed at monitoring businesses to ensure they do not sell alcohol to minors have enjoyed satisfactory results (these measures include retailer education, distribution of posters, visits by authorities, penalties, and radio and television information campaigns). Their study found a 16.4-percent reduction in alcohol poisoning in minors following the introduction of these measures.

Meanwhile, Colchero et al. (2020) examined the **change in the number of road traffic deaths after the Conduce Sin Alcohol (CSA, or Drive Without Alcohol) program was introduced in Mexico City**. This program, launched in September 2003, measures the blood-alcohol concentration of drivers in the city to reduce road traffic accidents. **A 23.3-percent decrease is observed in the number of road traffic fatalities between 2003 and 2016, compared with the period from 1998 to 2003**. This translates to a reduction in the number of deaths by 9.2–12 per million individuals. Mullachery et al. (2022) report that around one-third of road traffic deaths worldwide and **one in five deaths in Mexico can be attributed to alcohol use.** In Mexico, regular **sobriety checkpoints** have been employed since 2013 to combat drink-driving in areas with high accident rates. In a sample of 106 municipalities, the authors examined the number of fatalities per 10,000 passenger

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[24] In a similar vein, Euromonitor Consulting (2021) notes that consumption of alcoholic beverages fell by seven percent during the 2020 economic crisis due to the restrictions imposed. However, these same restrictions led to a change in on-trade and off-trade trends; on-trade sales fell from 22 percent to 13 percent during the pandemic, while off-trade sales increased from 78 percent to 87 percent. The restrictions imposed on alcohol sales were, in part, responsible for an increase in the share of informal sales of alcoholic beverages, which rose from 36.4 percent in 2017 to 42.5 percent in 2020. This trend was also influenced by the fall in spending power that resulted from the pandemic, which led consumers to seek cheaper drinking options.

vehicles after checkpoints were introduced and found a **12.3-percent reduction in deaths achieved two years after the checkpoints' introduction**.

In 2018, the WHO launched the SAFER initiative with the goal of reducing the harmful use of alcohol and preventing and controlling noncommunicable diseases.

These interventions seek to:

- **Strengthen restrictions on alcohol availability** through licenses for the production, sale, delivery, and serving of alcoholic beverages, as well as regulations on the number, density, and location of retail outlets, and by setting days and times for the sale of alcohol and a minimum age for the purchase and consumption of alcoholic beverages, prohibiting sales to minors, and restricting consumption in public places.

- **Advance drink-driving countermeasures**. This is based on restricting blood-alcohol concentration (0.05 g/dL or less for the general population), alcohol testing checkpoints, random breath-testing, suspension of driver's licenses, mandatory driver education, and treatment for repeat offenders, among other measures.

- **Facilitate** screening and **brief interventions** and develop affordable strategies to prevent and treat alcohol use disorders and other related conditions (such as drug use, depression, suicide, or HIV).

- **Enforce bans or restrictions**, and in particular, measures that target children, adolescents, and young people, for whom exposure plays a role in the decision to start drinking. This intervention also involves monitoring advertising.

- **Raise** prices on alcohol through **taxation and pricing policies**.

8. How are measures that limit alcohol availability associated with consumption?

Key messages: Consumption is more prevalent in areas with a high density of retail outlets, so limiting the availability of these outlets may decrease alcohol use.

Possible measures include licenses, restrictions on online sales and sales to minors, regulatory inspections, education, and advertising campaigns.

In research on the Mexican context, Colchero et al. (2022) found that 36 percent of participants engaged in binge drinking once a year, while 20 percent did so once a month and 6.6 percent once a week. Their study also found a **higher prevalence of binge drinking in areas with a greater density of retail outlets and in areas where prices are lower.** Binge drinking is also more frequent among smokers and those aged 18 to 34 years. Their findings suggest that in addition to imposing taxes, action should be taken to regulate the density of alcohol outlets, addressing aspects such as the distance between these outlets and schools and other public places, hours of sale, and a ban on open bars, among other measures.[25]

A number of studies show how **limiting the availability of alcohol reduces consumption.** Lozano et al. (2020) report that in 2016 and 2017, training was provided to 27,812 proprietors and employees, visits were made to 9,598 businesses in addition to 5,804 verification visits, and 32,931 individuals were educated on the risks of underage drinking. Their results revealed a significant reduction of 16.4 percent in acute alcohol poisoning.

As mentioned above, Hernández-Llanes et al. (2019) found a 16.4-percent drop in underage alcohol poisoning in Mexico following the introduction of measures **banning the sale of alcoholic beverages to minors**, together with retailer **education**, the distribution of **posters** to restaurants and retail outlets, **regulatory inspections** by authorities, financial **penalties**, and information **campaigns** on

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[25] An open bar is a bar where drinks are served without any charge. The cost of the drinks is borne usually by an admission charge or a sponsor.

radio and television.

III.   Concluding remarks

Alcohol use is associated with more than 200 diseases and conditions including various types of cancer, accidents, social problems like violence and crime, and labor productivity and economic losses. In Mexico, 48.6 million people drink alcohol, 4.7 million of whom are between 10 and 19 years of age, while the rest are adults.

The evidence summarized in this paper cannot be considered exhaustive. In this regard, there is a clear need for further research to improve the design of public policies aimed at reducing alcohol use. However, the studies reviewed indicate that **levying taxes on alcohol use has the effect of decreasing consumption**, and generally, taxes of this nature have a **greater corrective impact in lower-income households**. **A review should be conducted in the future** to determine whether to continue applying an **ad valorem system** in Mexico or switch to **ad quantum**, since evidence suggests that ad quantum taxation encourages the production of higher-quality beverages with lower alcohol content. It is also possible to combine the two systems, as is currently the case with cigarettes in Mexico.

Although fiscal policy has centered on taxation, **changes are also needed in public expenditure** because **only a very small share of IEPS revenue from alcoholic beverages is channeled into public programs to prevent and tackle addiction**.

Another consideration in determining the amount of tax to be applied in this sector involves making sure any such tax **does not encourage tax evasion and avoidance, illicit trade, nor the production of counterfeit beverages**. Taxing alcohol use will not come without challenges as this sector has significant economic power, is linked to many other sectors of the country's economy, and creates a substantial number of jobs.

Any fiscal policy applied to alcoholic beverages should be coupled with **other**

measures to bring down alcohol use even more effectively, especially among young people. These measures include **breathalyzer (sobriety) checkpoints**, restrictions on granting retailing **licenses** and on **advertising**, banning sales to **minors**, **education on the dangers associated with alcohol use**, **therapy**, and a review of the **density** and **location** of retail outlets, among others. In the short term, changes are needed in laws concerning the sale and delivery of alcohol products purchased **online**, which have boomed in the wake of the COVID-19 pandemic.

Low prices and the widespread availability of unregulated outlets are additional factors that facilitate alcohol use by young people. This is compounded by the problem of **intergenerational drinking and cultural issues such as tradition and religion**.

Appendix

The following table is intended to help readers identify the key quantitative results found in the various studies reviewed in this paper, with particular emphasis on the price elasticities of demand of alcoholic beverages in Mexico. The table presents the author and year of publication of the study, a description of the scenario proposed by the authors and, in the last column, a summary of the results observed.

Table A1. Price and income elasticity of demand

Author	Year of publication	Scenario/Proposal	Results
Ameida, A.	1999	Direct price elasticity	Tequila -0.288 Cane spirits -0.653 Beer -1.069 Grape spirits -0.585 Vodka, gin, and others 0.7777
		Income elasticity	Tequila 0.5729 Cane spirits 0.0046 Beer 1.257 Grape spirits 0.7038 Vodka, gin, and others 0.2212
Nicita, A.	2008	Price elasticity of alcohol and tobacco	Average -0.91 Income quartile 1 (Q1) → -0.98 Q2 → -0.91 Q3 → -0.86 Q4 → -0.93 Q5 → -0.50 Rural → -0.90 Urban → -0.93
Medina-Mora (et al.)	2010	1) Maintaining status quo (breathalyzer checkpoints, taxation)	Cost of 1,246 pesos per DALY averted
		2) 25% increase in taxes on consumption	Cost of 644 pesos per DALY averted

Author	Year of publication	Scenario/Proposal	Results
		3) 50% increase in taxes on consumption of high-proof alcohol products	Cost of 567 pesos per DALY averted
		4) Reduced availability of high-proof alcohol products	Cost of 2,040 pesos per DALY averted
		5) Regulating associated advertising	Cost of 1,802 pesos per DALY averted
		6) Brief preventive and persuasive interventions at the primary level of care	Cost of 14,342 pesos per DALY averted
		7) Random testing of motorists (breathalyzer)	Cost of 9,356 pesos per DALY averted
Urzúa, C.	2013	1% increase in the price of beer	Fall in demand of 1.082% in urban areas and 1.462% in rural areas
Catalán, H., (et al.,)	2016	Elasticity with 1% increase in beer prices	Short term: 0.25% reduction in demand Long term: 1.23% reduction in demand
		Elasticity with 1% increase in wine and spirit prices	Short term: 0.58% reduction in demand Long term: 1.48% reduction in demand
		Elasticity of demand for beer with 1% increase in income	Short term: 0.61% increase in demand for beer Long term: 3.04% increase in demand for beer
		Elasticity of demand for wine and spirits with 1% increase in income	Short term: 1.08% increase in demand Long term: 2.75% increase in demand

Author	Year of publication	Scenario/Proposal	Results
		Time preference rate for beer	Beer consumers have a preference for current consumption, with a time preference rate of 1.64.
		Time preference rate for wines and spirits	Consumers of wines and spirits place greater value on future consumption, with a time preference rate of 0.42.
Paraje, G., (et al.)	2018	Result for Mexico, with the annual growth rate of the ratio between nominal wages and the price of the good	Decrease in affordability of beer: -1.18%
Moreno-Aguilar (et al.)	2021	Increases in beer prices cause greater rates of decline in consumption	A 1% increase in the price of beer results in a 1.31% decrease in demand in the short term and a 1.40% decrease in the long term.
Huesca-Reynoso (et al.),	2021	Price elasticity	A 1% increase in the price of alcohol reduces demand by 0.59%.
		Cross-price elasticity	A 1% increase in the price of tobacco reduces demand for alcohol by 0.036%.
		Cross-price elasticity	A 1% increase in the price of soft drinks reduces demand for beer by 0.404%.
		Point elasticity of alcohol	A 10% increase in the price of alcohol reduces consumption by 7.7%.
Martínez (et al., 2023)	2023	Price elasticity of beer (short run)	-2.367
		Price elasticity of beer (long run)	-1.996
		Income elasticity of beer (short run)	5.046
		Income elasticity of beer (long run)	4.255

Table A2. Direct-price and cross-price elasticities

Beverage	Tequila	Cane spirits	Beer	Wines	Vodka, gin, and others
Tequila	-0.288	-0.136	-0.871	-0.058	-0.073
Cane spirits	0.045	-0.653	-0.487	0.645	-1.193
Beer	-0.016	0.127	-1.069	-0.189	0.174
Wines	-0.199	-0.491	-0.145	-0.585	-0.219
Vodka, gin, and others	0.453	-0.471	0.261	-0.031	0.777

Source: Author calculations with data from Ameida (1999)

The above table presents direct-price and cross-price elasticities. These are the percentage changes in goods in the left-hand column given a one-percent change in goods in the top row. For example, given a one-percent increase in the price of cane spirits, its quantity demanded would be reduced by -0.653 percent, and the quantity of beer demanded would rise by 0.127 percent. A one-percent increase in the price of tequila would reduce its demand by 0.288 percent and would increase the quantity of cane spirits demanded by 0.045 percent.

Goods can be categorized based on their direct-price and cross-price elasticity values:

Direct-price elasticities:

a) $|\epsilon_p| < 1$

Inelastic goods: given a change in price of one percentage point, the quantity demanded changes by less than one percent (for example, tequila).

b) $|\epsilon_p| > 1$

Elastic goods: given a change in price of one percentage point, the quantity demanded changes by more than one percent (for example, beer).

c) $\epsilon_p < 0$

Normal goods: direct-price elasticity is negative, so increases in price result in a decline in demand. For example, cane spirits are a normal inelastic good.

d) $\epsilon_p > 0$

Giffen goods: direct-price elasticity is positive because increases in price result in an increase in demand. For example, vodka, gin, and others are considered Giffen goods.

Cross-price elasticities:

a) $\epsilon_c < 0$

Negative cross-price elasticities mean that as the price of one good rises, the quantity demanded of another good falls. The two goods are

considered **complementary goods**. For example, when the price of beer increases by one percent, consumption of cane spirits decreases by -0.487 percent.

b) $\epsilon_c > 0$

Positive cross-price elasticities mean that as the **price of one good rises, the quantity demanded of another good increases**. The two goods are considered **substitute goods**. For example, when wine prices increase by one percent, consumption of cane spirits increases by 0.645 percent.

c) $\epsilon_c = 0$

Cross-price elasticities of zero, or very close to zero, mean that changes in the price of one good will have **no effect on the quantity demanded of another good**. These goods are considered **neutral or independent goods**.

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