

Using Fiscal Policy to Promote Health: A Five-Year Update on Taxing Tobacco, Alcohol and Sugar-Sweetened Beverages

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ABSTRACT

This narrative review examines key research from 2018 to early 2024 that addresses the taxation of unhealthy products, specifically tobacco, alcohol, and sugar-sweetened beverages (SSBs). It begins with a brief review of recent trends in consumption of these products, examines trends in relevant tax policies, reviews evidence on the impact of these taxes on prices, demand and health outcomes and ends with a discussion of the most recent research on industry counterarguments to implementing and raising taxes.

Consumption trends are uneven for tobacco: while some countries show declines, worrisome upward trends, particularly for youth, remain in some regions/countries. Alcohol and SSBs show more consistent upward consumption trends, globally. Progress on taxation for tobacco and alcohol has been uneven recently. Though tobacco taxation has a much higher starting point than for the other two products, much of the modest progress in the 2010s has stalled in most countries. Across countries with excise taxes on cigarettes, the average tax share of cigarette retail price was 42 percent in 2022, scarcely higher than the 41.4 percent in 2020, and far below the World Health Organization benchmark of 70 percent. The result is 87 percent of smokers live in countries where cigarettes were equally or more affordable in 2022 than in 2016. Alcohol taxes comprise a much lower share of price compared to tobacco and have shown scant improvement across most countries in the last decade – indeed, the number of countries reporting the use of alcohol excise taxes is decreasing. While there has been a substantial increase in the number of countries with SSB taxes since 2018, SSB taxes as a share of prices is, on average, very low, at only 18.4 percent. By contrast, evidence from the US suggests SSB taxes should increase prices by at least 40%. For each of these products, failure to regularly increase tax rates – at a minimum, in line with inflation – is leading to an erosion of impact.

Research on demand is unequivocal for all three products: consumer demand is significantly responsive to price. This implies that taxes are an excellent tool for decreasing demand. The evidence that higher taxes on these products improve a wide variety of health outcomes continues to build. Similarly, there is mounting evidence showing that 1) higher taxes on unhealthy goods are progressive at a population level; 2) health taxes scarcely negatively affect overall employment, if at all; and 3) illicit trade does not undermine the overall goals of these taxes, is generally much smaller than these industries claim, and can be successfully mitigated by improved tax administration including enhanced enforcement.

1. Introduction

Tobacco use and the consumption of alcohol and sugar-sweetened beverages (SSBs) continue to put the population at risk for numerous non-communicable diseases (NCDs) and other adverse consumption-related outcomes and to impose substantial economic costs to society. Despite some governments' efforts to implement evidenced-based policies to control these products, trends in consumption, consumption-related NCDs and preventable premature deaths remain a significant concern. Implementation of new health taxes or increases in existing taxes represents an important opportunity to curb consumption and improve public health.

The economic rationale for imposing health taxes based on negative externalities (e.g., healthcare, productivity, and other social costs) and internalities (e.g., inconsistent time preferences related to morbidity and mortality) associated with consumption has been well-established. In this regard, health taxes are considered a corrective policy tool, often referred to as a Pigouvian tax, that serve to increase prices (measured by tax pass-through) of targeted products and, in turn, reduce demand. The World Health Organization (WHO) recommends that tobacco excise taxes account for at least 70% of retail prices (WHO, 2010); however, evidence shows that they account for well under 50% on average (Drope et al., 2024). There is no international best practice for tax share of retail price for alcohol, but the evidence shows that shares for alcohol are considerably lower than for tobacco (Powell & Chaloupka, 2022; WHO, 2023c). Recent evidence based on U.S. data finds that to account for externalities and internalities associated with SSB consumption, SSB taxes should increase retail prices by approximately 40% (Allcott et al., 2019). Though many countries' health tax policy performances have been lackluster, some governments have made recent notable progress. For example, amid significant economic challenges, Pakistan's government raised tobacco taxes several times in 2022-23 sufficiently to drive down consumption and increase revenues (Tobacconomics, 2024). Also, some countries have introduced high SSB taxes such as Bahrain and the United Arab Emirates where the tax rate is 50% on soft drinks and 100% on energy drinks; and other countries have increased rates such as Barbados where the 10% SSB tax rate introduced in 2015 was recently increased to 20% in 2022 (World Bank Group, 2023). Despite some progress, it is not surprising that taxes generally fall short of recommended levels as policymakers face significant backlash when trying to implement or increase such taxes particularly related to industry interests in not having demand reduced. Many counterarguments related to taxes are put forth by industry, but some are also raised by civil society groups and policymakers need robust evidence related to these concerns which include, for example, job loss, regressivity and tax avoidance/evasion. Robust evidence can contribute to effective policy design and, in turn, greater population health improvements.

In 2018, the Task Force for Fiscal Policies for Health convened to generate interest in and momentum for health taxes. It was chaired by Michael Bloomberg and Lawrence Summers and put forward recommendations for how to raise taxes on unhealthy products—tobacco, alcohol and SSBs—in ways that promote public health and raise revenues that can be allocated toward policies that also engender economic prosperity and improve public health. The Task Force team released a series of supporting studies to provide an evidence base for the initiative including one by Chaloupka and Powell (2018) that provided a narrative review of the academic literature on the taxation of unhealthy goods. That review revealed that the academic literature to that point was much stronger for tobacco taxation than the other two. The broader evidence subsequently evolved considerably particularly as SSB taxes and concomitant research has grown dramatically. This background paper builds directly on the previous review by providing 1) an overview of trends in consumptions of tobacco, alcohol and SSBs; 2) an overview of recent changes (since 2018) in health tax policies worldwide; 3) an updated review and synthesis of evidence on impacts of health taxes including on prices, demand, substitution, and health; 4) an overview and evidence related to counter-arguments to health taxes including concerns related to employment, regressivity/equity and tax evasion/avoidance; and 5) concludes with a discussion of key takeaways for health tax policy development.

2. Consumption Trends

Consumption patterns for tobacco, alcohol and SSBs vary by country but recent evidence clearly demonstrates a significant ongoing global challenge for all three. Estimates show that between 1990 and 2019 the share of total deaths attributable to tobacco and alcohol consumption and diets high in SSBs has risen, particularly for lower-middle- and low-income countries (GBD, 2024). Most of these deaths are attributable to tobacco use followed by alcohol consumption, with SSB-related deaths making up a much smaller though growing proportion.

On the one hand, global smoking prevalence has been decreasing since 1990. A 2019 estimate suggests male smoking prevalence of 32.7% (32.3-33.0) and female prevalence of 6.6% (6.4-6.8). On the other hand, due partly to population growth especially in some countries with growing prevalence, there remain more than one billion smokers and several hundred million more using other tobacco products globally (Reitsma et al., 2021), greater than 1990 estimates though less than the estimated peak. Considering that male prevalence is greater than 20% in 151 countries (compared to 42 countries for females), it remains the leading risk factor for death globally and in most countries for males. Recent estimates suggest that more than eight million people die each year from tobacco-attributable disease, mostly from individuals smoking but with more than one million of those deaths from secondhand smoke (Brauer et al., 2024), with a disproportionate proportion of this burden borne by women and children. The economic costs have been estimated at 1.8% of global GDP or nearly two trillion dollars (Goodchild et al., 2018). The health and economic burdens continue to shift markedly toward lower-income countries as the number of smokers in those countries increases. Without significantly more population-level policy intervention, there will be more death, morbidity, and economic cost to society.

There are particularly worrisome trends in youth tobacco use with increases in many countries especially in low- or middle-income countries (LMICs) (Ma et al., 2021). The aggressive marketing of the tobacco industry to youth, particularly in countries with young and growing populations, contributes to this dynamic. The US Centers for Disease Control and Prevention and partners have implemented the Global Youth Tobacco Survey at least once in more than 140 countries and the results indicate that past-30-day cigarette smoking was 11.3% (95% CI 10.3-12.3) for boys and 6.1% (5.6-6.6) for girls. Moreover, the results indicate that youth tobacco use is stagnant or increasing in nearly half of the countries that were surveyed more than once. The survey also indicates that youth use of non-cigarette tobacco products is increasing in more than half of the surveyed countries.

Recent efforts to measure alcohol consumption have found mostly similar trends. Using mainly modeling techniques, academic research estimates that alcohol consumption has been increasing with continued increases forecasted at least through 2030 (Manthey et al., 2019). Annual per-capita consumption of alcohol in 1990 was estimated at 5.9 liters whereas the estimate for 2017 was 6.5. This is forecasted to continue to increase through 2030, to 7.6 liters. At the same time, the percentage of abstinence is decreasing, from 46 to 43% with a forecast of 40% for 2030; while the percentage of current drinkers is increasing, from 45 to 47% with a 2030 forecast of 50% (Manthey et al., 2019). The WHO (2023b) reports an upward trend in per capita alcohol consumption from 2000-2010 to a high of 5.7 liters, a plateau from 2010-15, and then a decline to 5.5 liters from 2015 to 2019. This finding was uneven across regions and countries, with substantial increases in South-East Asia and Western Pacific regions from 2000 to 2019. Shield et al. (2020) estimate global alcohol attributable deaths at approximately three million, led by cirrhosis of the liver, road injuries, and tuberculosis. Recent research also reinforces that alcohol is a major risk factor for cancer (Rehm et al., 2020) and injuries broadly (Chikritzhs & Livingston, 2021), and has major social implications through violence especially domestic (Mayshak et al., 2022). Some research has highlighted that consumption patterns (e.g., heavy use) can affect the magnitude of these effects (WHO 2023c). Manthey et al. (2021) estimate the economic costs of alcohol consumption at 2.6% of GDP, outstripping even the heavy costs of tobacco use, with a 2:3 ratio between direct costs (e.g., health expenditures) and productivity losses.

Recent research also demonstrates the harmful impact of alcohol per liter consumed is greater in lower-income countries (Shield & Rehm, 2021).

International trends in SSB consumption from 185 countries reveal that from 1990 to 2018 intake increased by 0.37 (0.29, 0.47) servings per week (Lara-Castor et al., 2023). Moreover, there have been significant increases in the number of adults living with chronic conditions related to SSB consumption such as diabetes and obesity (WHO 2023a; Phelps et al., 2024). Estimates show that, in 2021, 537 million adults had diabetes with 75% living in LMICs and that figure is projected to reach 643 million by 2030 and 783 million by 2045 (International Diabetes Federation, 2021). Recent worldwide estimates of obesity find that the global age-standardized prevalence of obesity increased between 1990 and 2022 from 8.8% to 18.5% for women and from 4.8% to 14.0% for men and among school-aged children and adolescents from 1.7% to 6.9% among girls and from 2.1% to 9.3% for boys; as a result, in 2022, more than one billion people were living with obesity (Phelps et al., 2024). These types of ongoing chronic conditions can pose substantial costs to society. For example, in the US, the total estimated cost of diagnosed diabetes in 2022 was \$413 billion (about \$12,000 per capita) (CDC, 2023). It is estimated that the economic costs associated with obesity will reach upwards of \$4.3 trillion (2.9% of GDP) worldwide by 2035 (Okunogbe et al., 2022).

3. Overview of Health Tax Policies Worldwide and Tax Revenue Magnitude and Potential

Taxes are increasingly being used as a health policy tool to address the consequences of consuming unhealthy products such as tobacco, alcohol and SSBs with the dual role of 1) reducing consumption and consumption-related health harms such as noncommunicable diseases, while at the same time 2) raising tax revenue. Arguably, a third dimension is that such taxes typically improve health equity as the benefits accrue disproportionately more to those in lower socioeconomic groups in most contexts. The longest and deepest history of using this type of instrument for promoting public health is arguably with tobacco measures, but taxing alcohol and SSBs for health is slowly catching up.

3.a. Overview of Health Tax Policies Worldwide

Tobacco Products

Almost all countries in the world have tobacco excise taxes, which has been the case for several decades. The most recent edition of the *WHO Global Tobacco Control Report* (GTCR) notes only 12 countries (out of 195) without tobacco excise taxes. However, not all these countries use such taxes for public health reasons—i.e., some governments utilize them mainly to generate revenue. Governments' performance on using tobacco excise taxes for both public health and fiscal health has been uneven. Using biennial data from the WHO GTCRs, the *Tobacconomics Cigarette Tax Scorecard* regularly tracks four key dimensions of tobacco taxation policies: tax share of price; absolute price; tax structure; and change in affordability. It uses the four components to generate an overall score. Higher overall scores are strongly associated with lower consumption (Ngo et al., 2024) and higher excise tax revenues (Lee et al., 2023). The second edition (Chaloupka et al., 2021) which examined progress from 2018 to the end of 2020 showed significant improvement in overall scores. The third edition revealed considerable backsliding (Drope et al., 2024). From 2020 to 2022, overall scores improved in only 31 countries (compared to 67 from 2018 to 2020). In contrast, overall scores worsened in 76 countries from 2020 to 2022, whereas that number was 37 from 2018 to 2020. Overall scores stayed the same in 55 countries from 2020 to 2022 compared to 64 from 2018 to 2020. In all editions of the Scorecard, the results suggest that performance is associated closely with country income: high-income countries (HICs) are generally performing the best and the lowest-income countries are performing the worst. That said, the HICs have taken the largest step backward in the most recent edition and the low-income countries (LICs) were the only ones showing improvement on average (albeit from a much lower starting point than the other country income groups).

The structure of tobacco taxation has considerable impacts on effectiveness. It is widely accepted that the gold standard for tobacco excise tax structure is a system based entirely or mostly on a uniform specific tax that has regular (e.g., annual) adjustments upward, most commonly for inflation, but sometimes also for economic growth and, preferably, more. Failing to adjust for inflation means that the effect of the tax starts to wane quickly (World Bank, 2023a). If there is use of an additional ad valorem tax, the best practice is to ensure that the specific tax is the more significant component and to apply the ad valorem component to retail price and ensure there is a minimum specific tax. In 2022, only 20 countries utilized optimal tobacco tax structures. Another 67 countries had reasonably good basic tax structures with reliance on specific taxes but were flawed in some key manner such as no regular adjustment of the specific tax or an ad valorem tax applied at a low tax base such as the producer price. There remain a significant number of countries with even more problematic tax structures including weak ad valorem systems, or arguably worse, complex, multi-tiered structures that provide significant opportunity for tobacco users to substitute down to cheaper products when there is a tax and/or price increase (found mainly in Asia).

Though the evidence shows clearly that consumption of tobacco products declines when they become less affordable (Nargis et al., 2021), tax policy is failing in many countries to make tobacco products less affordable. This is due in significant part to governments failing to keep up with economic growth and inflation (see tax structure discussion above), let alone implementing tax changes that outpace them, which is necessary to make these products less affordable. The Scorecard gives the highest grade to countries that have at least 7.5% average annual decline in affordability over the previous six years. In 2020, 26 countries achieved this goal, which was an increase of four countries from two years before. In 2022, only nine countries achieved this goal. Overall, only 13 percent of all the world's smokers live in a country where cigarettes became less affordable between 2016 and 2022, and only 40 percent of those smokers live in LMICs. Of the 156 countries where policies are not affecting cigarette affordability, 25 countries did not increase taxes and cigarettes became more affordable; 56 countries did not increase taxes and there was no change in affordability; 16 countries increased taxes, but the increase was too small, and cigarettes nevertheless became more affordable; and 59 countries increased taxes and there was no change in affordability.

Tax share is another useful metric embraced particularly by the WHO as a measure of health tax policy performance. Often, higher tax share indicates better outcomes for public health. It is a useful measure for evaluating global practice though it falls short in some circumstances particularly when retail prices are very low and/or tax structures are problematic. Of the 183 countries that currently report levying an excise tax on cigarettes, the average share of retail price (most-sold brand) was approximately 42%. This is scarcely higher than the 41.4% in 2020. Tobacco excise tax shares also vary enormously from zero to more than 70% (WHO, 2023e).

Alcoholic Beverages

Surveillance of alcohol tax policies has been much weaker than tobacco, but there are enough high-quality data to appraise the situation adequately. There have been two large recent global data collections on alcohol excise tax policies (Ngo et al., 2021; WHO, 2023c) as well as two additional regional ones (Papadaki, 2022; Roche et al., 2023). The broad findings are that significantly fewer governments utilize these taxes for alcohol compared to tobacco (148 reported using alcohol excise taxes compared to 183 for tobacco in 2022) and the median excise tax share of price is significantly less than for tobacco (~13.4 percent for beer and 24.8 for spirits compared to 42 for tobacco). Moreover, the number of countries reporting the use of alcohol excise taxes appears to be decreasing slightly whereas the average tax share has changed little in ten years. Unlike tobacco where there is considerable evidence of higher tax share as a reasonable barometer of performance, there is less empirical support currently for alcohol tax shares. Future research needs to consider other measures such as change in affordability to evaluate alcohol tax policy better.

Background Paper for the Task Force on Fiscal Policy for Health

Looking back to 2012, 192 countries provided data to the WHO's Global Information System on Alcohol and Health. Among these, 155 levied excise tax on beer, 138 on wine, and 151 on distilled spirits. There was a ban on alcohol sales in some countries though not in all the non-taxing countries. Chaloupka and Powell (2018) noted that taxes on alcoholic beverages were typically lower and accounted for a lower share of price in LMICs than in HICs, like with cigarette taxes. Excise tax share of retail price ranged widely among the 74 reporting countries, 0.3% (Kyrgyzstan) to 44.9% (Norway). The average excise tax share was 17.3% (beverage categories combined). The tax share of price was generally lower on beer than spirits, but with considerable variation. Tax structures varied in 2012, too. Of the 138 reporting countries that reported their tax structure, one-third used only ad valorem taxes, just over one-fifth utilized only specific taxes, and almost half used a combination of taxes. The ad valorem tax base varied across countries.

Progress on alcohol excise taxation was slow at best in the subsequent decade. To start, for the absolute number of countries utilizing these excise taxes, little has changed. The WHO (2023c) reports that as of mid-2022, 148 countries applied national-level excise taxes on alcoholic beverages. They noted that wine remained exempt in at least 22 countries, mostly in Europe, all of which have high wine consumption. The average tax share of retail price has also changed little. The global median tax share for beer was 13.4% for beer and 24.8% for spirits in 2022 and it varies across countries and regions. Taxes based on overall volume are more common for beer and wine while alcohol-content-based specific taxes are more common for spirits. Slightly less than one quarter of these countries have regular automatic adjustments—e.g., for inflation—so any effect of tax on price is eroding in most countries because of the lack of change. About one quarter of countries use ad valorem taxes with 60% doing so on the ex-factory price, counter to the best practice of applying the tax on the retail price. Not surprisingly, alcoholic beverages are typically very affordable. There is much less systematic research on this compared to tobacco, but the existing evidence suggests that these beverages are affordable. In Europe, on average, a household could purchase 1,628 standard drinks with their monthly income, and generally, these products were even more affordable in the highest income countries (Kilian et al., 2023).

Sugar-sweetened Beverages

Data from the World Bank's Global SSB Tax Database show that as of August 2023 132 SSB taxes were in place worldwide with one third having been implemented since 2018 (Table 1). Of these taxes, the vast majority (87%) are excise taxes and just under 7% are in the form of import duties. Of the excise taxes in place, just over half are specific taxes and just over one-third are ad valorem with the remainder being a mix. The vast majority (92%, 57/62) of the specific excise taxes are based on volume with a small proportion based on sugar content or a mix of volume and sugar content. In terms of the types of beverages covered by the taxes, the data show (not shown in tables) that almost all (98%) of the taxes apply to sodas and energy drinks and almost three quarters (73%) apply to concentrates. Approximately three quarters of the taxes also apply to diet (i.e., artificially sweetened) beverages. More than one half apply to sweetened juice, but less than one half apply to unsweetened juice. Additionally, less than one half of the taxes cover sweetened milk products.

The data by region show that SSB taxes have been implemented worldwide. In most regions, the taxes are at the national level with the exception of 2 in East Asia & Pacific, 1 tax in Europe & Central Asia; whereas in North America 10 of the 11 taxes are at the subnational level (not shown in the table). By country income levels, approximately one third of the taxes are in HICs, half are in middle income countries (roughly split across upper- and lower-middle income) and just 14% are in lower income countries. Of note, however, the share of the more recently introduced taxes was greatest among LMIC countries (37%) such that LMICs and LICs combined represented just over half (52%) of share of taxes introduced since 2018.

Table 1: Sugar-sweetened Beverage Taxes Worldwide, By Instrument Type, Structure and Region

	All Taxes	Taxes Introduced Prior to 2018	Taxes Introduced 2018 - Aug 2023
	N	N	N
Total Taxes Introduced	132	91	41
By Instrument and Structure			
Excise	115	79	36
Specific	62	40	22
Volume	57	38	19
Sugar	3	2	1
Volume + Sugar	2	0	2
Ad Valorem	41	30	11
Mixed	12	9	3
Sales	2	1	1
VAT/GST	6	3	3
Import	9	8	1
By Region			
East Asia & Pacific	27	24	3
Europe & Central Asia	21	12	9
Latin America & Caribbean	22	19	3
Middle East & North Africa	8	4	4
North America	11	6	5
South Asia	6	5	1
Africa	37	21	16
By Country Income Group			
High income	45	31	14
Upper-middle income	30	24	6
Lower-middle income	35	20	15
Low income	18	12	6
Not classified	4	4	0

Source: Authors tabulations of data available from the August 2023 World Bank Global SSB Tax Database. Available at: <https://ssbtax.worldbank.org/>

There is some evidence now available on SSB tax shares of SSB prices. A recent study of Latin America and the Caribbean countries found that median excise taxes represented 6.5% of the price of carbonated SSBs and 2.3% for energy drinks (Roche et al., 2022). A WHO report finds that globally the median excise tax share for a 330 ml of an internationally comparable brand of a carbonated SSB is 3.4% with a median total tax share of 18.4% (WHO, 2023d). These estimates are very low particularly compared to tax shares of prices for tobacco and alcohol and they do not meet the example based on U.S. data of the recommended price increase of 40% to account for the externalities and internalities associated with SSB consumption (Allcott et al., 2019).

3.b. Tax Revenue Magnitude and Potential

A recent World Bank publication has provided an update on the current magnitude of health taxes by products and countries, and it provides an overview of revenue potential for health taxes including from increases in tax rates and reforms of tax structures (World Bank, 2023b). The Box below reports the Summary of this publication.

“Introducing, reforming and increasing health taxes on tobacco, alcohol, and sugar-sweetened beverages (SSBs) can generate meaningful increases in tax revenues while improving health outcomes over time. Using a novel health tax revenue database that draws on publicly available sources as well as country data, our analysis shows that tobacco and alcohol excise taxes generate an average of 0.6 and 0.3 percent of GDP in tax revenue, respectively. SSB taxes generate significantly less revenue than tobacco and alcohol.

Health tax revenues vary widely between countries, affected by tax design including tax structures and tax rates, tax administration and baseline levels of consumption. However, there is no significant variation between high-income and low- and middle-income countries, highlighting the usefulness and importance of health taxes to all countries.

Reforms of health taxes, including reforming tax structures and raising tax rates can contribute to significant increases in revenue very rapidly. Tax increases can be sustained over long periods, generating additional tax revenues over long periods of time. Even for countries with relatively high tax rates, tax increases still generate increases in tax revenues when these rates are increased regularly.

Health taxes are efficient since they are relatively easy to implement, can generate revenue quickly, and limited distortion to general economic activities. Health taxes are also fiscally progressive once the long-run behavioral effects of reduced consumption, reduced medical expenses, and increased labor productivity are accounted for. The expenditures that are funded by increases in general revenue because of health taxes can further increase the progressive distributional impact of health taxes.” (World Bank, 2023b)

4. Evidence on Impact of Health Taxes

There is a large body of evidence strongly supporting tobacco taxation as a public health (and fiscal) policy instrument, discussed at length in the previous background paper (Chaloupka & Powell, 2018). The evidence has grown further and is consistent with the earlier work. In brief review, the evidence has shown and continues to show overwhelmingly that governments have used such measures successfully over the last couple of decades: when taxes increase, prices increase, and consumption decreases; and with the decline in consumption, there are huge rewards to health and the economy. Excise taxes are a highly effective instrument to reduce demand. The effects of tax-induced changes in prices on demand are substantial: on average, a 10 percent price increase leads to a five percent decrease in consumption in LMICs and four percent in HICs. This is due to a combination of more young people not initiating, many smokers quitting, and many smokers cutting down. As this evidence suggests, tobacco is a consistently inelastic good, meaning that the proportion of decline in consumption is less than the price increase, and this has considerable helpful implications for revenues: consumption decreases while revenues increase. This is the win-win to which many fiscal and public health experts point.

In some relevant research areas, the evidence is not yet as rich for alcohol taxation, but it is steadily growing for it, too. The existing evidence shows unequivocal patterns very similar to that of tobacco. Alcohol is also a consistently inelastic good at roughly the same level as tobacco, which means that price increases have considerable negative effects on consumption while raising tax revenues. These patterns are consistent across regions and country income group, suggesting strongly that alcohol excise taxation is an outstanding public health strategy globally.

Given that most SSB taxes implemented with a health objective are relatively new (introduced within the last decade), a large body of evidence has been published on the impact of real world SSB taxes on prices and the demand for SSBs since the last background paper was written. New evidence is also now available on substitution and reformulation. Additionally, evidence previously lacking on nutrition and health impacts is emerging but is still limited.

Tobacco Products

Tax Pass-through

Chaloupka and Powell (2018) examined the important issue of how firms respond to tax increases in their pricing strategies. To review, firms have the choice to pass the full tax increase on to the consumer (“full pass through”), absorb some of the tax increase to minimize the effect on price (“under-shifting”), or increase prices beyond the tax increase (“over-shifting”). In the last five years, there has been increasing research on this topic for tobacco. In a comprehensive review, Sheikh Branston, Gilmore et al. (2023) reported that there are no obvious patterns by region or country income. Instead, they argued that it is driven principally by demand maximization or profit maximization under the specific market conditions of the place and time. The former is about keeping customers and/or finding new ones and has an emphasis on longer-term profit. The latter focuses on the bottom line of increasing profits in the shorter term. There is a building consensus in the literature that tobacco companies generally use under-shifting to maintain or attract low-income smokers. Companies believe that under some circumstances it is worth keeping prices low even in the face of a tax increase and some downside to their short-term profits. Tobacco companies also frequently work this into an anti-tax campaign, complaining publicly that they cannot raise prices because it will significantly hurt their business and ostensibly, employment. Broader strategies of over-shifting appear more common in HICs like the US (Apollonia & Glantz, 2020) and the United Kingdom (Hiscock et al., 2019; Wilson et al., 2021) and generally demonstrate that the industry has substantial room to raise prices and still maintain their financial health. Thus, for those governments choosing not to raise excise taxes more, this is strong evidence that they are likely forgoing significant tax revenue, which goes directly to company profits. Very commonly, there is a double strategy of over-shifting the premium brands to maintain or even increase revenues (taking advantage of the lower elasticity of the mostly wealthier users of these products) and under-shifting the economy brands to maintain a base of lower-income customers and to attract young people who generally have less income. This dynamic has been well documented in Colombia (Sheikh et al., 2024), Mauritius (Valdois et al., 2020), Montenegro (Mugoša et al., 2023), and Malawi and Nigeria (Sheikh, Branston, van der Zee et al., 2023). Other related research demonstrates that the tobacco industry has more options for flexible pricing in complex tax structures such as the tiered ones in much of South Asia (Nargis et al., 2020).

Impacts on Demand

As noted above, a substantial body of literature has previously demonstrated that tobacco tax increases have been associated with reductions in demand. Most estimates of overall price elasticity cluster around -0.4 in HICs, suggesting that a 10 percent price increase reduces overall consumption by four percent. Cigarette demand is responsive to price in LMICS, too, though price elasticity estimates tend to be more variable, typically from -0.2 to -0.8, and clustering around -0.5. Despite a significant number of tobacco excise tax increases, ex-post evaluations are scarce. Part of the challenge has been the lack of recent substantial tax reforms to examine. In Australia, Cho et al. (2023) found that tax increases have driven down consumption of cigarettes modestly, but the diversity of products, many of which remain affordable, including especially roll-your-own tobacco, mitigates the effects of these tax increases. In the United Kingdom, Partos et al. (2019) examined the 2002-14 period and found that although cigarettes became less affordable, it was not sufficient to have a large effect on consumption. They concluded that tax increases need to be larger to affect consumption.

Research has continued to evaluate the relative effectiveness of different tobacco tax structures. Shang et al. (2019) found that specific or largely specific excise tax structures are more effective because they reduce price variation and substitution to cheaper products, which is consistent with earlier work. At the same time, they found that tiered tax structures are woefully inadequate and create even larger opportunities for substitution because of the wide price variation and inevitably, the widespread existence of very inexpensive tobacco products.

Health Impacts

There is a large body of evidence demonstrating the significant positive impacts of tobacco taxes on health, much of it reviewed in the earlier background paper, and empirical work with similar findings continues to build. The findings consistently demonstrate that raising tobacco taxes saves many lives, decreases most tobacco-related illnesses, and as a result, decreases health spending. In the US, Cohen et al. (2023) found that tobacco taxes had a significant effect on reducing smoking prevalence and a corresponding negative effect on coronary heart disease. Friedson et al. (2023) examined the effect of a one-dollar cigarette tax increase on teens in the US and found it was associated with significantly lower future adult prevalence (by eight percentage points) and a four-percent mortality reduction. Examining the gaps in life expectancy between urban and rural dwellers in the US, researchers found that around 20 percent of the widening gap was due to changes in smoking behavior, particularly that people living in cities were benefitting from trends of decreasing smoking prevalence (Hendi & Ho, 2022). Much of the recent work on the health impacts of tobacco taxation has been based on modeling. Cleghorn et al. (2018) examined the steady increases in New Zealand's tobacco excise taxes and found significant reward to quality adjusted life years—in other words, healthier years lived on average— with large commensurate health cost savings.

Alcoholic Beverages

Tax Pass-through

Nelson and Moran (2019) reviewed 30 empirical studies of alcohol tax pass-through and found consistent evidence of over-shifting. Shang et al. (2020) found evidence of widespread over-shifting, too, though it was not perfectly uniform. Gehrsitz et al. (2021) found the same in the US state of Illinois. These findings support—though imperfectly, as the researchers point out—the notion that the alcohol market is competitive. In other words, the alcohol industry consistently raising prices more than the tax increase demonstrates that alcohol beverage companies believe there is sufficient space to raise prices without hurting their profits, and in fact are enhancing them. This should be an indication to governments that in most circumstances, they could raise taxes even more, which would negatively affect consumption but would not have an economic effect on the sector more broadly. The difference in the higher prices would thus go more to governments than to company profits.

Impacts on Demand

There is a growing literature on tax increases' effects on demand. Chaloupka and Powell (2018) reported that research from HICs have generated mostly consistent findings for alcoholic beverages showing that overall price elasticity for alcohol falls between -0.51 and -0.77. They found that the evidence was more limited for LMICs, but overall elasticity was in the same range at -0.64. Guindon et al. (2022) reported similar findings in a recent systematic review. Total own-price elasticities for beer, wine and spirits were approximately -0.3, -0.6 and -0.65, respectively. They found that most research concludes that higher taxes and prices have been associated with lower heavy drinking and heavy episodic drinking, though the effect sizes were mostly uncertain. This dynamic may enhance taxes' positive public health effects because of the higher likelihood of greater magnitudes of harm caused by these patterns of drinking. In contrast to tobacco, they also found that there is less conclusive evidence that alcohol price responsiveness differs by socioeconomic status. Consistent with what was previously reported by Chaloupka and Powell (2018), they found similar price responsiveness between LMICs and HICs.

There have been several recent evaluations of alcohol excise tax reforms. A WHO report (WHO, 2019) illustrates that Russia's alcohol excise tax increases in the 2010s helped to decrease consumption and raise excise tax revenues. A study of five European countries (Estonia, Germany, Latvia, Lithuania and Poland) shows that increases in alcohol excise taxes were accompanied by greater revenues and either decreased or stagnant consumption (Manthey et al., 2024). Hu et al. (2023) examine alcohol tax policy in China from 1961 to 2019 and demonstrate not only large decreases in consumption after large tax

increases, but prevalence of alcohol use disorders and related years lived with disability decline. When the government relaxed tax policy in 2006, the three indicators reversed in direction.

Health Impacts

There is growing evidence of positive effects of alcohol tax increases on public health. Lithuania had one of the larger recent alcohol tax increases and has received scholarly attention. Tran et al. (2022) found that the alcohol excise tax increases had a large impact on all-cause mortality. A different ex-post analysis showed tax increases were linked strongly to decreases in all-cause mortality inequalities in men, although the effect appeared to be temporary (Manthey et al., 2023).

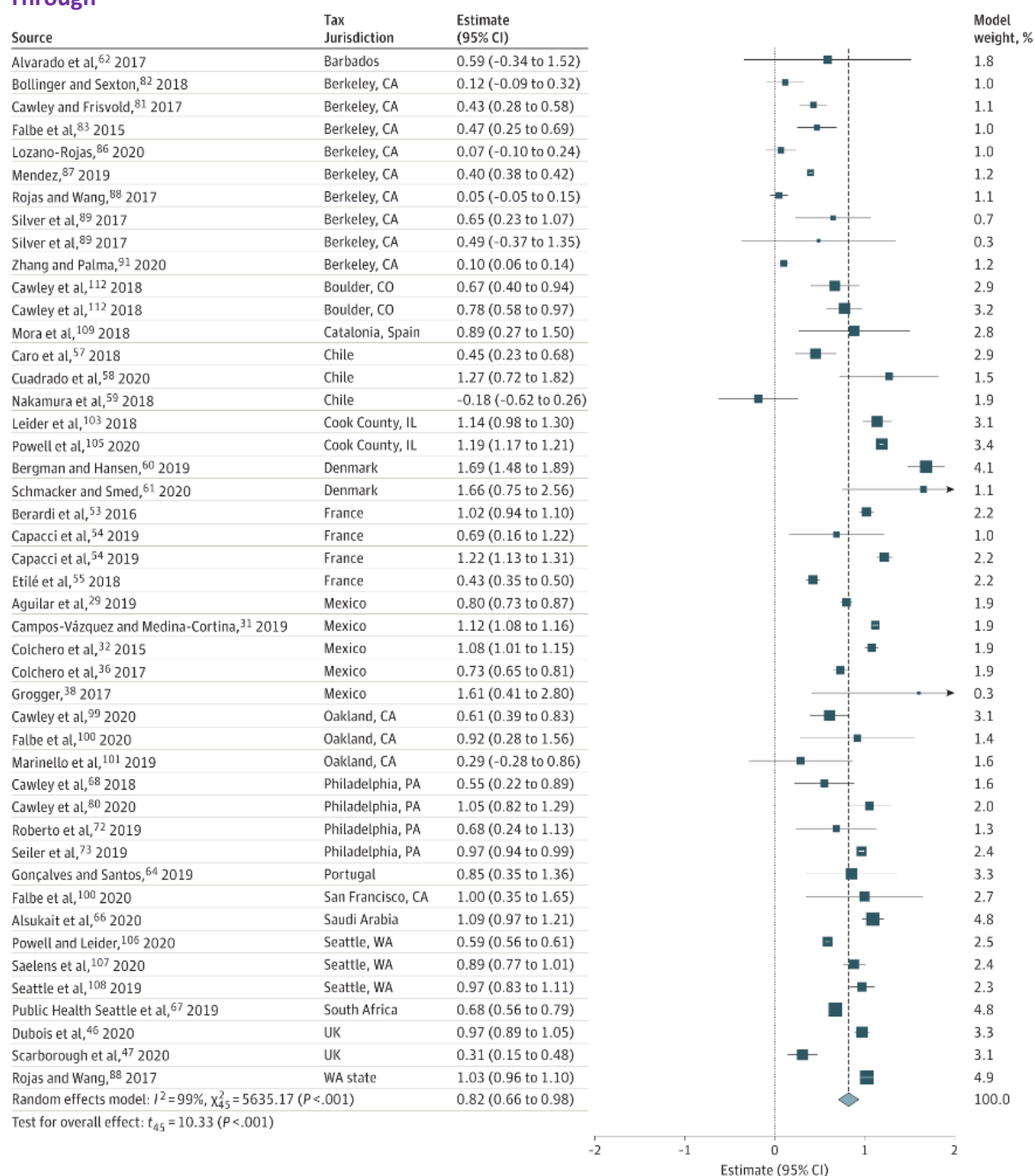
Modeling is also used routinely to understand the effects of alcohol taxation on health. Kilian et al. (2021) modeled tax increases for the European region and found that a 100% increase in alcohol excise taxes would likely generate a nearly six percent decrease in cancer cases. Similarly, Rovira et al. (2021) used four European countries and showed that alcohol taxation is contributing to fewer cancers. Neufeld et al. (2022) also modeled alcohol tax increases in Europe and found that introducing a minimum tax share of price of 25% could avert more than 40,000 deaths. They also modeled a 15% tax share that equalized across alcohol content and found that it would avert more than 130,000 deaths.

Sugar-sweetened Beverages

Tax Pass-through

A substantial body of literature now exists on price outcomes following the implementation of SSB taxes (80% of which has been published from 2018 onwards). This evidence shows that SSB taxes are generally passed on to consumers in the form of higher prices. As shown in Figure 1, a recent worldwide review and meta-analysis of 46 estimates (from 41 studies covering 18 tax policies) found a tax pass-through rate of 82% (Andreyeva et al., 2022). Over one half of these estimates come from evaluations of US SSB taxes. A meta-analysis of 26 estimates (from 22 papers [19 papers published from 2018 onwards] across seven taxing jurisdictions) in the US found a tax pass-through rate of 70% (Powell, Marinello, et al., 2021). Among the US studies, several that assessed the Berkeley, CA, tax did so in the short-run (i.e., several at 6-months or less post-tax) and found quite low pass-through rates – mostly less than 50%. A study for Oakland that used weekly store scanner data found that the estimated tax pass-through increased substantially over the first year from 34% 1-4 months post-tax to 45% 5-7 months post-tax and 70% 9-11 months post tax (Léger & Powell, 2021) which was shown to then be sustained 2-years post-tax (Leider & Powell, 2022). Most recently, a study of five US taxes found tax pass-through over 2-years post tax to be almost complete at 92% (Kaplan et al., 2024). Results from other countries have mostly found high pass-through; several (e.g., Mexico, the U.K.) found close to full (100%) tax pass-through and in some cases over-shifting (> 100%) (e.g., Denmark) (see Figure 1). Of note is relatively low tax pass-through in restaurants; for example, 31% in the UK (Scarborough et al., 2020) and 29% in Oakland, CA, particularly low for fountain drinks for which no tax pass-through was found (Marinello et al., 2019). Thus, the evidence suggests that apart from in restaurants, SSB taxes are generally increasing the prices of SSBs as intended with limited under-shifting.

Figure 1: Meta-analysis of Price Outcomes Following Sugar-Sweetened Beverage Taxes: Tax Pass-Through



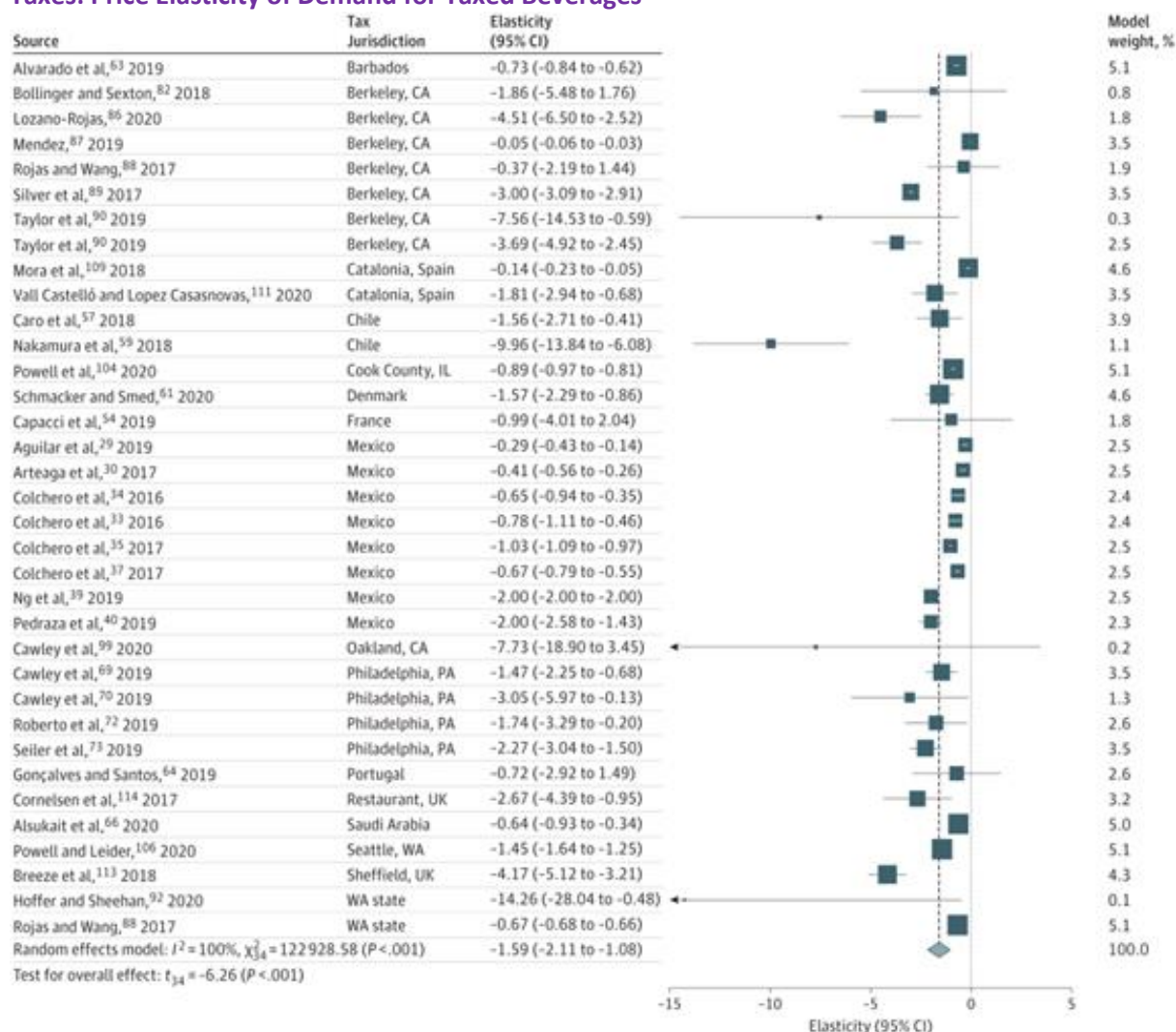
Source: Figure 2, Andreyeva et al., 2022

Impacts on Demand

A growing body of evidence has emerged worldwide that generally shows consistent SSB tax impacts in terms of reducing the demand for SSBs; this includes evaluations of the impact of SSB taxes introduced at the national and subnational levels. Several reviews have meta-analyzed these findings including the worldwide WHO-commissioned study on SSB tax impacts which found that across 35 estimates from 33 studies based on 16 tax policies there was a 15% reduction in SSB sales, with a corresponding estimated price elasticity of demand of -1.59 (see Figure 2 below); that is, a tax that raises prices by 20% is estimated to be associated with a 32% reduction in demand for SSBs (Andreyeva et al., 2022). A number of other meta-analyses based on real world SSB taxes confirm that the demand for SSBs is price elastic. For example, the SSB price elasticity of demand was found to be -1.0 in another

worldwide review (Teng et al., 2019); -1.36 in a review of SSB taxes in the region of the Americas (PAHO, 2021); and, -1.47 in a review of local-level US SSB taxes (Powell, Marinello et al., 2021). In analyses of a subset of studies with estimates on cross-border shopping effects, it was found that, on average, approximately one quarter of the reduction in SSB sales in US taxing jurisdictions was offset by cross-border shopping with an estimated price elasticity of -1.05 after adjusting for cross-border shopping (Powell, Marinello et al., 2021).

Figure 2: Meta-analysis of Sugar-Sweetened Beverage Sales Following Sugar-Sweetened Beverage Taxes: Price Elasticity of Demand for Taxed Beverages



Source: Figure 3, Andreyeva et al., 2022

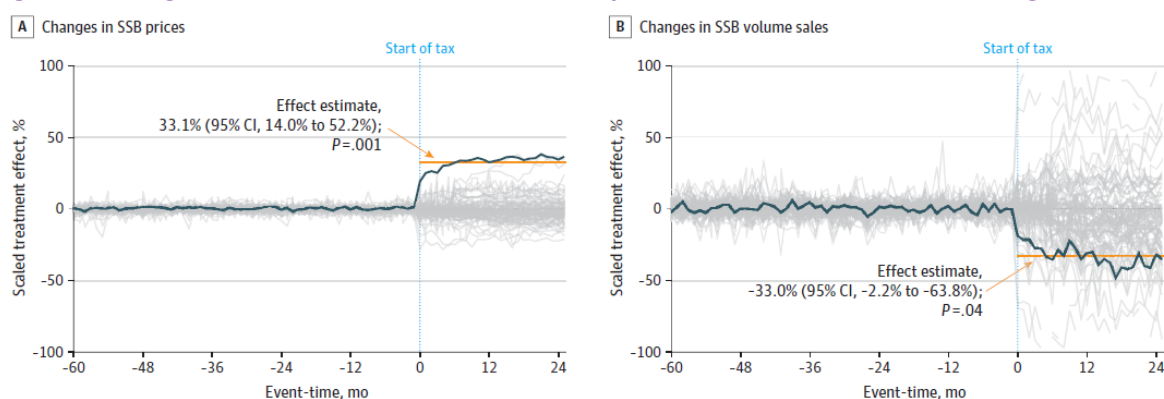
Given that SSB taxes implemented with health goals are relatively new and initial evaluations of such taxes mostly used up to one-year follow up data, a key question for policymakers is whether observed reductions in demand will be sustained. Evaluations of national and subnational SSB taxes have now assessed multi-year follow-up periods and have found that reductions in demand have generally been sustained in the longer run. For example, while a previous study of the Mexico SSB tax had already shown a sustained 7.8% two-year impact (a 5.5% reduction in SSB purchases one-year post-tax and 9.7% at two-years post-tax) (Colchero et al., 2017), a more recent study showed that the reduction in volume of SSB purchases was sustained 3-years post-tax but that it had leveled off (Pedraza et al., 2019). Additionally, a cohort study of adults in Mexico found an increase in the prevalence of not consuming soft drinks and a decrease in medium and high levels of consumption more than three-years after the implementation of the tax (Sánchez-Romero et al., 2020). A study of the Catalonia SSB tax found that regular cola purchases decreased approximately 12% during the two-year post-tax

period (Puig-Codina et al., 2021). A descriptive study of SSB sales in Saudi Arabia that included data two years post-tax following the implementation of their large SSB tax of 50% in 2017, found that from 2010 to 2020 SSB sales fell by approximately 58% (Megally & Al-Jawaldeh, 2020). However, a study of SSB taxes in France and Hungary found limited evidence that reductions in SSB sales were sustained two years after tax implementation (Kurz & König, 2021).

Numerous longer-run evaluations of local US taxes have also found sustained impacts on demand. For example, sustained reductions in net volume sold of SSBs after accounting for any cross-border shopping were found for Philadelphia, PA, (-33%) and Seattle, WA, (~18%) (Petimar et al., 2022; Powell & Leider, 2020). As shown in the second panel of Figure 3, a study of five US taxing jurisdictions found a sustained two-year post-tax reduction in volume of SSBs purchased which declined, on average, by 33.0% (Kaplan et al., 2024). Beyond two-years post-tax, a study of the Oakland SSB tax found a sustained 27% reduction in the volume of SSB purchases 30-months post-tax implementation (White et al., 2023) and another recent study found reduced soda consumption among Philadelphia high school students was sustained four-years post tax (Flynn, 2024)

As noted earlier, given that specific excise taxes erode due to inflation if they are not adjusted, it will be important to monitor the share of SSB taxes as part of prices and the extent that demand continues to be impacted in the much longer run.

Figure 3: Changes in SSB Prices and Sales Volume 2-years Post-tax across Five US Taxing Jurisdictions



Source: Figure 3, Kaplan et al., 2024

Substitution and Net Impacts on Sugars and Calories

Given that a key goal of SSB taxes is to reduce the intake of sugars and related calories and improve overall nutrition, it is important to not only examine and understand changes in demand for SSBs but also net impacts on diet as tax-induced substitution to other sugary or high-calorie non-taxed products may offset nutrition gains associated with reduced SSB intake. SSB tax evaluations have generally shown limited to no substitution to other high-calorie foods such as sweets and snack foods (Saelens et al., 2020; Bleich et al., 2021; Gibson et al., 2021; Oddo et al., 2021; Petimar et al., 2022). A study in Mexico found that calories and sugars from taxed beverages purchased decreased and while the volume of untaxed beverage purchases increased, there were limited changes in calories or sugars from untaxed beverages (Pedraza et al., 2019). A US study showed a significant net decrease in overall grams of sugars sold from SSBs even after accounting for potential substitution to grams of sugar from sweets, non-taxed beverages and standalone sugar (Powell, Leider, et al., 2021). In terms of assessing changes in sugar intake, an evaluation of the UK Soft Drinks Industry Levy (SDIL) found that not only were there significant reductions in the consumption of free sugars from beverages but there were also reductions in daily consumption of free sugars from the whole diet among both children and adults (Rogers et al., 2024) and another study found that the SDIL was associated with 6,600 calorie reduction per year per UK resident (Dickson et al., 2023).

Reformulation and Reduced Sugars

Taxes that are structured with tiered or continuous rates based on the sugar content of beverages can induce not only reductions in demand for SSBs but also supply-side responses in terms of reformulation as firms reduce sugar content in beverage products in order to reduce the amount of the tax applied to the products. Thus, the reduction in intake of sugars from SSBs can come from both reduced SSB consumption and less sugars in SSBs that are still consumed.

The South African SSB tax (Health Promotion Levy - HPL) effective in 2018 was imposed at a rate of ZAR 0.021 per g of sugar per 100ml in excess of 4g/100ml and research that decomposed a pre-post HPL implementation 32% decrease in the sugar content of household beverage purchases found that reformulation accounted for 34% of the change (Bercholz et al., 2022).

The UK multi-tiered SDIL (£0.24 per litre for beverages with > 8 g of sugar per 100 mL, £0.18 per litre for beverages with between 5 and 8 g of sugar per 100 mL, and no tax for beverages with < 5g per 100ml) provided a two-year lead time prior to implementation for producers to reformulate. One study found a substantial post-implementation decline in the proportion of soft drinks offered at UK supermarkets that were over the lower levy sugar threshold (Scarborough et al. 2020) and another study found that reformulation by manufacturers contributed to 80% of the estimated levy-induced calorie reductions from SSB consumption (Dickson et al., 2023).

A study of Poland's sweetened beverage tax (PLN 0.5 per litre for beverages with sugar content that does not exceed 5 g/100 mL or with at least one sweetener, and PLN 0.05 for each gram of sugar >5 g/100 mL) found that the median sugar content fell 20% and 13% in carbonated and non-carbonated beverages, respectively, and that the proportion of beverages that contained >5 g of sugars/100 mL fell from 70% to 44% from 2020 to 2021 (Wierzejska, 2022).

Health Impacts

Evidence on the impact of SSB taxes on health is emerging but remains limited. Nonetheless, evidence is now available for taxes across different countries including both national and subnational taxes and across different populations (both children and adults and pregnant persons) and suggests that SSB taxes can translate into a number of improvements in population health.

In terms of oral health, a study of the Mexico SSB tax that drew on data from 2007-2018 found that the implementation of the 2014 SSB tax was associated with reduced outpatient visits related to dental caries, reduced cases of decayed, missing and filled teeth in primary and permanent dentition, and reduced number of teeth with caries in primary and permanent dentition (Hernández et al., 2021).

A study of the UK SDIL estimated that at 22-month post-implementation the tax was associated with lower hospital admissions for carious tooth extractions among children (Figure 4 –Rogers, Conway et al., 2023). A study of dental records for Philadelphia, PA, that examined decayed, missing and filled teeth found that there was no association with its sweetened beverage tax for the general population but that the tax was associated with reduced decay among lower-income (those on Medicaid) adults and children (Petimar et al., 2023).

Figure 4: Incidence of Hospital Admissions for Carious Tooth Extractions in Children Following the Announcement and Implementation of the UK SDIL

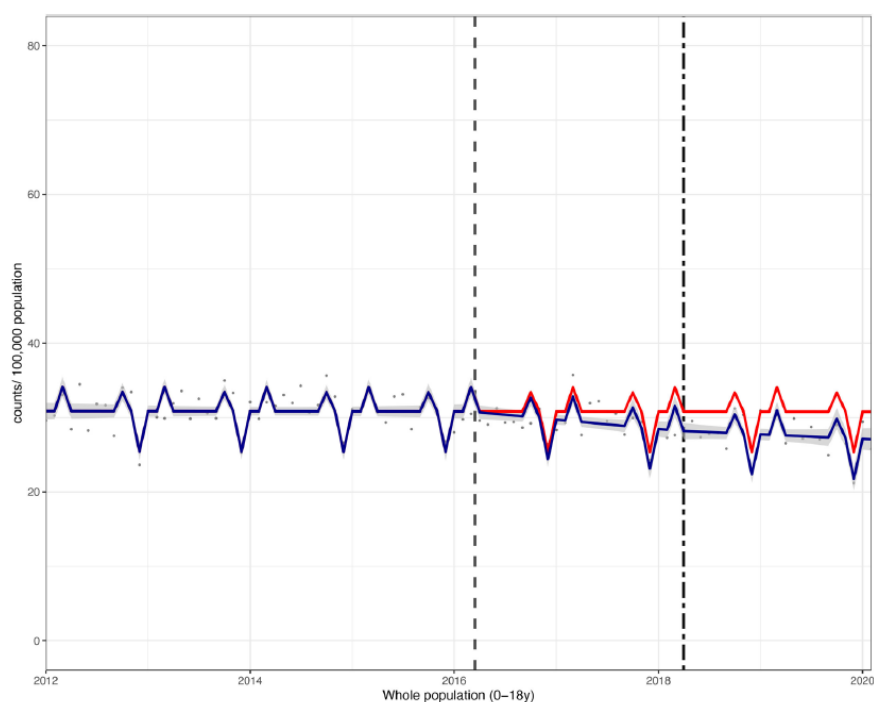


Figure 2 Incidence per 100 000 population per month of hospital admissions for carious tooth extractions, in children aged 0–18 years between January 2012 and February 2020. Observed and modelled incidence of hospital admissions for carious tooth extractions is shown. Dark blue points show observed data and dark blue lines (with grey shadows) show modelled data (and 95% CIs) of incidence. The red line indicates the counterfactual line based on the pre-SDIL announcement trend (based on the announcement and implementation having not occurred). The first and second dashed vertical lines indicate the time of the SDIL announcement and implementation, respectively. SDIL, soft drinks industry levy.

Source: Figure 2, Rogers, Conway et al., (2023).

A study of perinatal health following the implementation of five sub-national SSB taxes in the US found that the SSB taxes were associated with reduced risk of gestational diabetes mellitus, lower maternal weight-gain-for-gestational-age and lower risk of infants born small for gestational age (Jackson et al., 2023).

A number of studies have evaluated body weight outcomes (body mass index [BMI] or obesity prevalence) following the introduction of SSB taxes and the results are mixed but promising with the studies to date focused on children and adolescents. An evaluation of the UK SDIL found that 19-months post-tax implementation obesity prevalence was lower for girls ages 10-11 but did not find significant changes among 10–11-year-old boys or younger (ages 4-5) children (Rogers, Cummins et al., 2023). A Mexico study also found gender differences with a tax-related association with reduced prevalence of overweight and obesity among adolescent girls but not boys (Gračner et al., 2022). A study that examined BMI outcomes following the introduction of the SSB tax in Mauritius found a very small and statistically insignificant association with BMI among youth aged 12-17 (Cawley et al., 2022). Evaluations of US subnational (Philadelphia, San Francisco and Oakland) taxes found lower BMI among high school students post-tax implementation in these cities with larger effects for females and non-white students (Flynn 2023, 2024)

5. Counter Evidence related to Arguments Against Excise Taxes

5.a. Macro-economic Outcomes including Job Loss

Chaloupka and Powell (2018) countered a ubiquitous industry argument that raising excise taxes on unhealthy products hurts employment and/or the macroeconomy. Most of the earlier research found little relationship between tax increases and loss of jobs or at worst very small negative impacts.

Tobacco Products

There have been several rigorous empirical studies on tobacco taxation and employment, particularly in middle-income countries, in the last five years. Most of this research finds unequivocally that raising tobacco excise taxes has little or no effect on employment, and in many circumstances if there is an effect, it is a positive one. In Mexico, researchers found that if the excise tax were set to 1.50 pesos per stick (a major increase), there would be large decline in consumption (26%), excise tax revenues would increase by nearly half, and job losses would be just 0.1% of employment. Moreover, if the government were to invest some of this new tobacco tax revenue as a direct healthcare subsidy, it would instead generate a net gain of more than 32,000 jobs or about 0.12% of employment (Huesca, Llamas & Sobarzo, 2022). In Argentina, Cicowiez et al. (2024) found an almost null effect of increased tobacco taxes on employment in contrast to demonstrable positive effects on health outcomes, economic productivity, as well as health cost savings and decreased youth initiation. Using Input-Output analysis in Pakistan, Saleem and Iqbal (2020) found a large net economic gain from increasing excise taxes on cigarettes. The increased tobacco taxation leads to less consumption causing small initial economic losses but the redistribution of tobacco expenditures from those decreasing consumption or quitting leads to significant gains in output, employment, and income. Similarly, Nguyen et al., (2020) found in Vietnam that increasing tobacco taxes generates net positive output and employment. In Indonesia, Bella et al. (2023) also found that increasing tobacco excise taxes generates net positive income, output and employment.

It is worth noting the relationship between the structure of the tobacco product supply and value chains and employment. At the manufacturing end, most factories are now highly automated and there are few jobs. Though many jobs in the retail sector are touched by tobacco sales, the research has consistently shown that consumers shift spending to other goods and services, and the effect on retail employment has historically been small and often even positive including for establishments that rely heavily on tobacco sales (Huang & Chaloupka, 2013). More jobs are likely to be affected by reduced consumption in the agricultural sector, but the research consistently shows that tobacco farmers not only shift relatively easily to other crops and economic activities, but also typically increase household resources when they do (Sahadewo et al., 2021).

Alcoholic Beverages

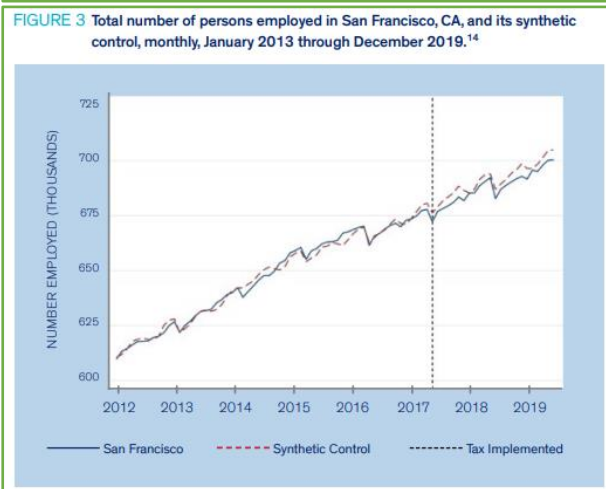
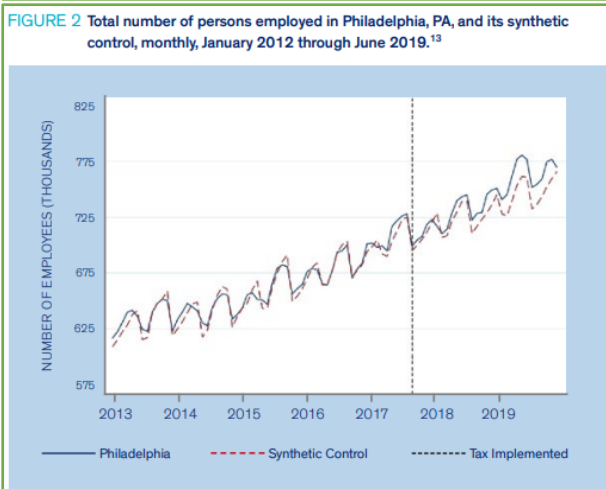
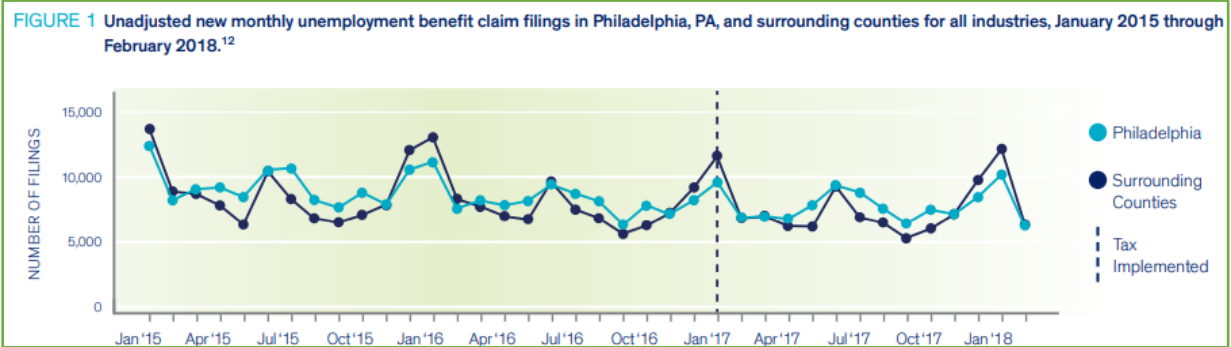
The research on employment effects of alcohol taxes has been slow to grow. A recent examination of a proposed alcohol tax increase in the US state of Hawaii predicted that a \$0.10 per drink increase would add more than 1500 new jobs if the new tax revenues were allocated to general government services such as education and law enforcement (Sparks et al., 2022).

Sugar-sweetened Beverages

Several reviews on the impact of SSBs taxes on employment and labor markets have been published since 2018 and conclude that SSBs taxes have not had an adverse impact on employment or other labor market outcomes (Mounsey et al., 2020; Marinello & Powell, 2021; Mounsey et al., 2022). As noted previously and highlighted in reviews, it is not surprising that there are no overall impacts on employment because as consumers reduce SSB purchases they reallocate spending to other goods and services, including untaxed products from the same beverage industries, and governments spend the revenue generated by the tax; that is, those dollars are not removed from the economy.

Previous evidence on employment impacts was based on only one real world tax evaluation for Mexico (Guerrero-López et al., 2017) and otherwise mostly simulation models. New evidence from real world tax evaluations (examples in Figure 5) shows no impact on jobs or unemployment claims following the implementation of SSB taxes in Philadelphia (Lawman et al., 2019; Marinello, Leider, Pugach, et al., 2021), San Francisco (Marinello, Leider & Powell, 2021) and Peru (Diaz et al., 2023). Additionally, there can be productivity gains for the economy resulting from improved population health (Mounsey et al., 2020).

Figure 5: Employment and Unemployment Post-tax Implementation in Two US Taxing Jurisdictions



Source: Lawman et al., 2019; Marinello, Leider, Pugach, et al., 2021; Marinello, Leider & Powell, 2021 as shown in review by Marinello and Powell, 2021.

5.b. Illicit Trade / Tax Evasion and Tax Avoidance

The industries that make unhealthy products consistently cite the high probability of increased illicit trade resulting from higher taxes and prices as a reason for government not to raise excise taxes on these goods. Concomitantly, they publicly announce estimates for levels of illicit trade with little or no empirical basis. The public health community is starting to respond and there has been substantial growth in rigorous empirical research in this area.

Tobacco Products

Recent research on estimating illicit trade in tobacco products documents empirically how the tobacco industry consistently over-estimates the levels of illicit tobacco trade as a strategy to undermine taxation efforts. A narrative review on illicit trade in cigarettes in Latin America (Drope et al., 2022)

provided evidence from six countries in Latin America (Argentina, Brazil, Chile, Colombia, Mexico and Uruguay) where the industry greatly overestimated illicit trade and vigorously promoted their estimates to their governments and the public. Vellios et al., (2020) documented similar serial overclaims of the tobacco industry in South Africa for 2002 to 2017, which contrasted with transparent and rigorous independent estimates. When for a variety of reasons, illicit trade in South Africa later became a demonstrable challenge (Vellios & van Walbeek, 2024), the tobacco industry's rhetoric appeared to change little. In Chile, in 2018-20, a period when the tobacco industry publicly claimed that there were major increases in illicit trade, the estimated decrease in total consumption of cigarettes was greater than the decline in tax-paid cigarettes which points logically to a decrease in the volume of the illicit ones (Paraje, Pruzzo et al., 2023).

Even though there is little evidence of countries where increases in illicit trade have reversed the positive effects of tobacco taxes on public health and tax collection, this trade can still undermine either one or both if it increases the size of the low-priced cigarette market. In other words, it can potentially lessen the effect size of tobacco tax increases. Accordingly, recent research has also been methodically examining the nature of illicit cigarette trade, which is critical for identifying policy remedies. Research in Paraguay compared tax-paid domestic sales and legal exports to domestic consumption to show how oversupply in the Paraguayan domestic cigarette market is driving illicit trade throughout significant parts of South America (Masi et al., 2022). The recipient countries of these products are well documented, including Argentina (Pizarro et al., 2022) and Brazil (Szklo et al., 2022). In Pakistan, Sabir et al. (2022) showed the problems with self-reported production to tax authorities in a context of insufficient monitoring have contributed to companies grossly underpaying their tax bills and tax revenues undermined by it. Research on tobacco supply chains has revealed complexities that help governments to pinpoint and address this trade from the input side. Countries export inputs to other countries driving illicit trade. Ribeiro and Pinto (2020) show how Brazil is a major cigarette input supplier to Paraguay whose producers then smuggle illicit cigarettes back into Brazil.

Research is also showing that straightforward and well-documented remedies are working. The Protocol to Eliminate Illicit Trade in Tobacco Products, a treaty linked to the FCTC, came into force in 2018 under the auspices of the WHO and its provisions are helping to drive down illicit trade in some countries (Paraje et al., 2022). For example, a couple of governments in the Western Balkans have taken recent steps to tackle their challenges in that region (Vladisavljevic et al., 2022). In Montenegro, the government prohibited companies to store cigarettes in their free trade zones and began to enforce other existing measures more forcefully and illicit trade in cigarettes plummeted and tobacco tax revenues increased dramatically (Tobacconomics, 2023).

In other new research on illicit cigarettes, evidence from Brazil (Szklo & Drope, 2024) demonstrates that mature, large illicit markets begin to look more like mature licit markets wherein the price of illicit brands increase, even above the legal minimum price. In related research, Divino et al. (2024) found that smokers of licit brands in Brazil did not substitute to illicit brands when faced with price increases.

Tax avoidance for cigarettes—particularly through legal cross-border shopping to other lower-tax jurisdictions—has been well documented for more than a decade. Recently, Stoklosa et al. (2020) found that the combination of price differences and the free movement of people in the European Union across land borders help to predict levels of tax avoidance but that an upward convergence of price would largely eliminate this practice. Notably, a related study found no evidence of tax avoidance in high-tax France after a tax increase (Gomajee et al., 2021). As of early 2024, the European Commission is working to revise the European Tobacco Tax Directive, presenting an excellent opportunity to raise revenues, mitigate cross-border purchasing and drive down tax evasion.

Alcoholic Beverages

Researchers typically use the term, “unrecorded alcohol” rather than “illicit” because illicit products comprise only part of the market of alcoholic beverages not paying taxes. For example, in many countries, there is significant legal home production. Though it has lagged illicit tobacco research, there has been significant new research seeking to measure unrecorded alcohol. Unlike cigarettes wherein representative samples of packs can be inspected either through collecting discarded packs or asking smokers to show the pack of their last purchase, assessing alcohol consumption is less straightforward. Researchers have been using a mix of expert opinion and detailed survey questions to those who drink alcoholic beverages about the types of products they consume (Probst et al., 2018; Probst et al., 2019).

Rehm et al. (2022) found that increases in taxation and subsequent price increases of commercial alcohol products did not automatically drive-up levels of unrecorded alcohol. Instead, the level of unrecorded alcohol is more related to: a) the availability of unrecorded alcohol; b) the types of unrecorded alcohol; c) the stigmatization of this consumption; d) the nature of groups who consumed unrecorded alcohol before the tax increase; and e) existing policies. After a significant alcohol tax increase in Lithuania, there were no major changes in unrecorded alcohol but sizeable increases in excise tax revenue (Lithuanian Tobacco and Alcohol Control Coalition, 2020). In Russia, unrecorded alcohol decreased slightly after significant tax increases (WHO, 2019).

Previous research found evidence of legal cross-border shopping for alcoholic beverages from higher to lower tax jurisdictions. Recent work generated similar findings (Friberg et al., 2022; Zirculis, 2024). These findings further reinforce that tax parity between or among jurisdictions is likely among the best solutions to preserve both the public health and fiscal rewards of higher taxation, in addition to policies that limit this activity and corresponding enforcement efforts.

This area of research demands more attention. Unlike illicit cigarettes that are mostly if not entirely indistinguishable from licit ones, some forms of unrecorded alcohol pose acute danger to individuals such as when methanol contents are at toxic levels. Though this is not an issue in most countries, regulatory authorities need to surveil the marketplace to ensure the safety of these products. Unfortunately, the alcohol industry frequently and dramatically overstates these incidences and uses them to undermine tax efforts (Paraje, Jha et al., 2023).

Sugar-sweetened Beverages

Sugar-sweetened beverages are low-cost, high-volume and heavy and as a result, unlike cigarettes and some alcoholic beverages, illicit products are exceptionally rare. However, tax avoidance in the form of cross-border shopping may occur for local-level taxes or national taxes with soft borders. For example, there is new evidence on cross-border shopping for the recent subnational-level SSB taxes in the US. As noted above, in meta-analyses based on five SSB tax evaluation studies (Roberto et al., 2019; Powell & Leider, 2020; Powell et al., 2020; Léger & Powell, 2021; Seiler et al., 2021) that estimated the extent of cross-border shopping, it was estimated that, on average, approximately one quarter of the estimated reduction in demand for SSBs was offset by cross-border shopping (Powell, Marinello et al., 2021). However, some evidence is mixed across studies within jurisdictions where two studies found presence of cross-border shopping for Oakland at one and two-years post-tax (Léger & Powell, 2021; Leider & Powell, 2022) but a more recent study 30-months post-tax did not (White et al., 2022). In terms of national taxes, threats can be present for soft borders, and this has been highlighted as a key issue for policymakers in the European Union (Thow et al., 2022) and noted with respect to the 2014 repeal of the Danish SSB tax (Schmacker & Smed, 2020).

5.c. Regressivity/Equity Concerns

Concerns have often been raised that health taxes will impose undue burdens on lower-income populations. This stems from the fact that health taxes are consumption taxes which in and of themselves are regressive since lower-income individuals spend a higher proportion of their income on consumption goods. However, health taxes are intended to reduce consumption and improve related health outcomes many of which burden lower-income and/or minority populations to a greater extent. Further, lower-income individuals tend to be more price responsive than their higher-income counterparts and therefore may reduce consumption to a greater extent and, in turn, the taxes may yield progressive health benefits. Below we summarize evidence for tobacco, alcohol and SSBs on the extent of consumption and consumption-related health outcomes among lower-income populations and evidence from tax evaluations on differential impacts based on income and other population characteristics.

Tobacco Products

The evidence base for understanding regressivity and/or equity concerns around tobacco taxation is strong and growing rapidly. Much of the research focuses not only on individuals' reactions to taxes/prices but also broader consumer behaviors that help us to understand the distributional effects (i.e., how different socioeconomic groups are affected) of both tobacco use and policies like taxation that seek to minimize it. The previous review revealed that lower-income individuals are more likely to smoke in most countries and are consistently more sensitive to price. As a result, research on tobacco taxation has shown across regions and country income groups that at a population level, tobacco tax increases are progressive and almost always improve health and tax equity (and in many cases, broader economic equity, too).

There continues to be generation of strong evidence across disparate countries that lower-income smokers spend disproportionately more on tobacco products than their higher-income peers. Recent research further supports this finding in Albania (Merkaj et al., 2023), India (Venkataraman et al., 2019), Iran (Rezaei et al., 2020), Montenegro (Cizmovic et al., 2022), and Pakistan (Saleem & Iqbal, 2021).

Related research on the “crowding out” effect of tobacco spending has proliferated widely across the globe in recent years. There is strong evidence of diverted spending, particularly by low-income families, from some important activities that promote health and/or long-term prosperity-promoting (e.g., health care, education, housing, healthy food, etc.) to tobacco products including in Bangladesh (Husain et al., 2018), Colombia (Gallego et al., 2024), Ghana (Masa-ud AG, 2019), Indonesia (Swarnata et al., 2024), Mexico (García Gómez et al., 2023), Namibia (Iipumbu, 2020), Pakistan (Saleem & Iqbal, 2021), Serbia (Institute for Economic Sciences, 2021; Vladislavljevic et al., 2024), and Vietnam (Nguyen & Nguyen, 2020; Nguyen et al., 2023).

Closely related research from different regions also demonstrates that tobacco use impoverishes households and individuals. Researchers have used such measures as headcount ratios to track increases in poverty from tobacco use in Albania (Merkaj et al., 2023), Mexico (Sanchez & Gomez, 2024) and Vietnam (Nguyen et al., 2022).

Research has been building for some years demonstrating the medium and long-term progressivity of tobacco taxation. In a World Bank review of research in eight countries across several regions (Bangladesh, Bosnia, Chile, Indonesia (clove cigarettes), Moldova, Russia, South Africa and Ukraine), researchers report that though the initial price shock of higher prices affects lower income smokers and their households disproportionately, these smokers are more price responsive and more likely to quit or decrease consumption and as a result, any negative shocks are offset quickly by greater relative gains over the medium and longer term through lower medical expenditures and more years of work (Fuchs et al., 2019). A follow-up report (Fuchs & Pierola, 2023) that added three more countries

(Georgia, Mexico, and Vietnam) to the original eight found that the net effect of tobacco excise taxes was progressive. These findings are echoed strongly in other research from Albania (Zhlhlima et al., 2019), Argentina (Cruces et al., 2022), Bosnia (Gligorić et al., 2019, 2022), Ethiopia (Chakrabarti et al. 2022), Mexico (Huesca, Llamas, Vargas Téllez et al., 2022) and Montenegro (Cizmovic et al., 2022). Nayab et al. (2020) find a similar result in Pakistan, too, where low-income and rural smokers appear to drive the significance of elasticity. In Brazil, Divino et al. (2022) use extended cost-benefit analysis and find that low-income smokers benefit disproportionately more from lower medical expenses on tobacco-related diseases and longer, healthier, and more productive lives, including higher incomes on average for those who stop smoking. Other research finds that you can enhance progressivity by making sure there are policies to help low-income smokers to quit (Verguet et al., 2021).

Notably, tax structure may also affect progressivity. Research finds that low-income smokers likely benefit less from tax increases in countries with large price variation because it is easier to substitute with a cheaper product. Thus, as introduced above, tax structure is a critical component of good tax policy—research continues to demonstrate that specific excise taxes are superior to purely ad valorem systems for shrinking price variation among cigarette brands (e.g., Nguyen & Nguyen, 2022).

Alcoholic Beverages

Though more mixed than smoking, there is evidence that lower-income groups in some countries use alcohol disproportionately more. A comprehensive review by Allen et al. (2018) finds greater alcohol use among lower-income groups in Southeast Asia, though mixed findings from Africa using studies that mostly had smaller sample sizes and weaker methods. In New Zealand, researchers show that inexpensive alcohol is driving health inequity because lower-income heavy and/or daily drinkers are more likely to use it and suffer the consequences (Esther & Jackson, 2022). Related evidence suggests that treatment for alcohol use disorder is less accessible to lower-income people (Koffarnus et al., 2021).

There is emerging evidence on the crowding out effect of alcohol spending and it is broadly consistent with the tobacco literature. For example, recent research from Kenya (Magati & Guerrero-Lopez, 2024), Malawi (Jolex & Kaluwa, 2022) and Namibia (Iipumbu, 2020) demonstrates a similar crowding out effect wherein alcohol spending crowds out spending on housing, health care and education, among other generally “healthier” spending. This effect is most pronounced among those in lower socioeconomic groups.

There is limited research on the overall alcohol tax burden by income group. Research suggests that in the UK the alcohol tax burden is relatively equal across income groups (Bhattacharya, 2020). Thus, if low-income users are more price sensitive as most studies show, tax increases will be progressive in the UK.

As noted above (Guindon et al., 2022), existing research is inconclusive about differential effects of price on demand for alcohol by socioeconomic group. This contrasts to the enormous body of evidence available across countries and regions on tobacco that demonstrates lower-income tobacco users’ greater sensitivity to price. More research is needed in this area.

Sugar-sweetened Beverages

Evidence shows that SSB consumption and obesity are increasing at a relatively high rate in LMICs (Baker et al., 2020). Additionally, within-country evidence has demonstrated socioeconomic status (SES) inequities in SSB consumption finding that lower SES (measured by either income or education) are heavier SSB consumers than higher SES (e.g., Warren et al., 2022). With respect to diabetes, recent estimates for the US (2019–2021 National Health Interview Survey) show that the prevalence of

diabetes for adults is 13.1% for those with family income less than 100% of the federal poverty level (FPL) versus a prevalence of 5.1% for those with income of 500% FPL or more (CDC, 2023) and similarly there is an obesity SES gradient although it differs by race/ethnicity/sex (CDC, 2024).

Previous evidence based on price studies and two tax evaluations showed larger price/tax related reductions in SSB demand for lower versus higher-income populations. A number of recent tax evaluations have assessed differences in changes in demand following SSB tax implementation by SES. A study for South Africa found that not only did lower SES households purchase greater amounts of taxed beverages pre-tax implementation but they also had greater reductions in purchases post-tax (Stacey et al., 2021). Further, another study for South Africa that included both adolescents and adults found that SSB intake frequency fell by two times per week in medium-intake consumers and by seven times per week in high-intake consumers 12- and 24-months post-tax (Wrottesley et al., 2021). Studies for Mexico have revealed mixed evidence; one study found greater price responsiveness among lower-income populations (Ng et al., 2019); although another study for Mexico found no significant post-tax differences in soft drink consumption across income levels but did find stronger effects for adults with secondary school education or higher versus those with elementary school or less (Sánchez-Romero et al., 2020). Additionally, a recent study of seven US cities did not find that the extent of reductions in SSB purchases varied based on whether household income was above or below the median (Barker et al., 2022). However, recent evidence that has emerged on health outcomes for the US suggests that SSB tax-related improvement in health are larger for lower-income (Petimar et al., 2023) and minority populations (Flynn 2023, 2024).

Overall, a number of new studies suggest progressive reductions in consumption and health-related benefits from SSB taxes, but more work is needed across different taxing jurisdictions to fully understand the potential equity implications. It has previously been emphasized that concerns about regressivity can further be addressed by targeted spending of tax revenue for lower-income populations and underserved communities. Indeed, a recent study of the Seattle SSB tax found that although lower income populations paid a higher percentage of their income in beverage taxes there was no difference in absolute spending on beverage taxes per capita and, additionally, after taking into consideration the fact that there was a sizable net transfer of tax-revenue-related funds towards programs targeting lower income populations, the tax could be considered an equitable public policy (Jones-Smith et al., 2022).

6. Key Takeaways

Taxing unhealthy products such as tobacco, alcohol and SSBs is a proven intervention to drive down consumption and increase tax revenues. Currently, taxes for all three are too low in most countries and need to be raised, and in the case of SSB taxes many countries have yet to introduce them. Introducing new health taxes and raising existing taxes will make these products less affordable and reap both public health and fiscal benefits. Our key findings are:

Health taxes work

- Higher tobacco, alcohol and SSB taxes are increasing prices as intended except for SSB prices in restaurants, particularly fountain drinks.
- Higher tobacco, alcohol and SSB taxes have significant impacts on reducing demand (even after accounting for cross-border shopping) and these impacts are sustained.
- For SSBs, there are no significant offsets to sugar intake from substitution to other sugary products.
- Evidence shows consistent and substantial impacts of tobacco, alcohol and SSB tax increases for improved public health and greater tax revenues.

Health taxes remain too low

- Alcohol and SSB taxes remain low for almost all countries/jurisdictions – new evidence for the US suggests that SSB excise taxes should be at least 40% of the retail price. Both alcohol and SSBs remain affordable to most consumers across most countries.
- Tobacco excise taxes and tax shares of price vary considerably across the world though they continue to be low in many countries. The WHO set 70 percent as the benchmark but the average is scarcely above 40 percent. Tobacco taxes are not increased frequently enough to make tobacco products less affordable in most countries.
- Broadly, failure to increase tax rates on unhealthy products regularly-- at a minimum by indexing for inflation-- leads to an erosion of the effect on consumption.

Arguments against health taxes are overstated and not evidence-based

- Evidence based on real world taxes shows no major adverse impacts of tobacco, alcohol or SSB taxes on jobs in a wide range of countries.
 - For tobacco, most studies show a positive effect on overall employment from excise tax increases.
- Evidence shows that lower-SES populations are typically heavier consumers of tobacco and SSBs and are at greater risk for related NCDs and obesity (from SSBs). At the same time, evidence shows that lower-SES populations are more responsive to tobacco and SSB taxes and thus the health and economic benefits are progressive at a population level.
- The evidence for either progressivity or regressivity of alcohol taxes is not yet conclusive, but the evidence suggests that those in lower-SES populations are affected more economically and health-wise by alcohol use and have less access to treatment.
- Though tax evasion and avoidance can increase from tax increases, they do not reverse the positive public health or revenue benefits. Moreover, though most governments have done little to address these issues, the ones that have put in place evidence-based policy interventions are successfully mitigating these challenges.

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