

KN5. Sugar-Sweetened Beverage Taxes: Rationale, Evidence and Design for Improving Health¹

The purpose of this note is to provide an updated overview of 1) the rationale for implementing sugar-sweetened beverage (SSB) taxes, 2) the impact of SSB taxes on prices, the demand for SSBs and substitutes, and economic outcomes, and 3) tax design, revenue, and tax administration considerations. A summary of policy considerations is also provided to aid in decision-making.

SUMMARY

Sugar-sweetened beverage (SSB) taxes are an important fiscal and health policy tool since they raise tax revenue and improve health by reducing demand, as well as reduce health expenditures by alleviating the burden on the health system.

SSB taxes can be designed efficiently to reduce costs of over-consumption related to both negative externalities and internalities and do not generally distort other aspects of economic activity (i.e., they do not lead to job loss). SSB taxes result in net progressive distributional outcomes since reductions in health expenditures and increased productivity can particularly benefit the poor.

The design of SSB taxes requires careful attention with the type, scope and characteristics of the tax structure influencing the policy transmission mechanism, including incentives for firms to reformulate products. It is important to take into consideration the authorities' tax administration capacity as some tax structures can be complex. Overall, SSB taxes can be considered a win-win policy that can help to improve health outcomes and at the same time generate tax revenues, while generating benefits for equity, health system efficiency, and further societal gains.

A companion [Q&A document](#) delves into complementary issues and commonly asked questions about SSB and broader nutrient-based taxes.

1. RATIONALE FOR SUGAR-SWEETENED BEVERAGE TAXES

Health taxes are excise taxes imposed on products that have a negative public health impact, and include taxes on tobacco, alcoholic drinks, and sugar-sweetened beverages² (SSBs).³ In their own right, health taxes are one of the most cost-effective policy measures for reducing the consumption of these products and associated mortality and morbidity. Relatedly, the economic framework for health taxes has multiple goals and highlights their special nature: first, health taxes aim to reduce the quantity demanded for the taxed products in order to reduce consumption-related “externalities”, e.g., additional publicly funded healthcare costs, productivity costs; second, they reduce “internalities”, e.g., inconsistent time preferences related to individual harm; and, third, health

taxes can generate additional revenue (Chaloupka, Powell and Warner, 2019; World Bank 2023a).

The consumption of SSBs, and related intake of excess sugars, is a risk factor for noncommunicable diseases (NCDs) and, in turn, increases mortality and imposes social and economic costs on society. SSB consumption is directly linked to type 2 diabetes, obesity, dental caries, cardiovascular and stroke risk, and some types of cancers (Vartanian et al. 2007; Malik et al. 2010a, 2010b, 2013; Bleich and Vercammen 2018; Malik and Hu 2019; Wang et al. 2022). Additionally, obesity itself is a significant risk factor for numerous NCDs including heart disease, stroke, diabetes, and some cancers (Rexrode et al. 1997; Kurth et al. 2002; Renehan et al. 2008; Abdullah et al. 2010; Khan et

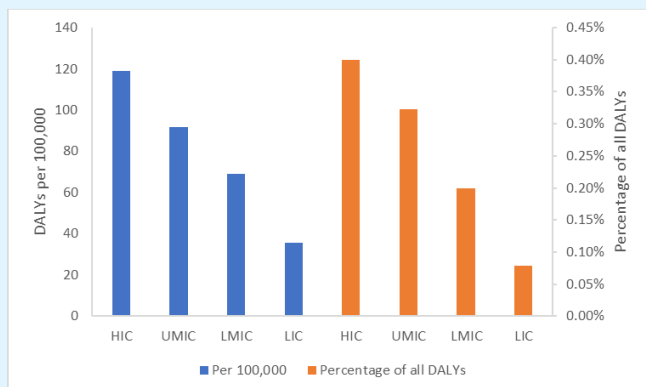
¹ This note was prepared by Lisa M. Powell (University of Illinois Chicago) and Evan Blecher (World Bank), with inputs from Ceren Ozer and Danielle Bloom (World Bank), and Anne-Marie Thow (University of Sydney). The authors wish to thank peer reviewers Felipe Dizon, Kyoko Shibata Okamura, and Violeta Vulovic (World Bank); Patrick Petit (IMF); Chonlathan Visaruthvong and Itziar Belausteguigoitia (WHO), and Linde Kremer for support (also World Bank). This series is produced via the Global Tax Program Health Tax Project under Task Team Lead Ceren Ozer.

² Sugar-sweetened beverages: non-alcoholic beverages sweetened with added free sugars (for example, including fructose, glucose, high-fructose corn syrup, honey and/or sucrose).

³ Throughout this knowledge note references to SSB taxes generally refer to excise taxes unless specified as another type of tax. This is similarly assumed when making comparison to other types of health taxes such as taxes on tobacco and alcohol products.

al. 2018). The prevalence of obesity worldwide has nearly tripled since 1975; in 2016, more than 650 million adults and 124 million children and adolescents aged 5-19 were estimated to have obesity (NCD-RisC 2017, WHO 2021a). It was estimated that 4.7 million people died prematurely due to high body mass index in 2017, representing approximately 8% of deaths (GDB 2018). The number of people with diabetes worldwide rose from 108 million in 1980 to 422 million in 2014, and, in 2019, 2 million deaths were attributable to diabetes (WHO 2023).

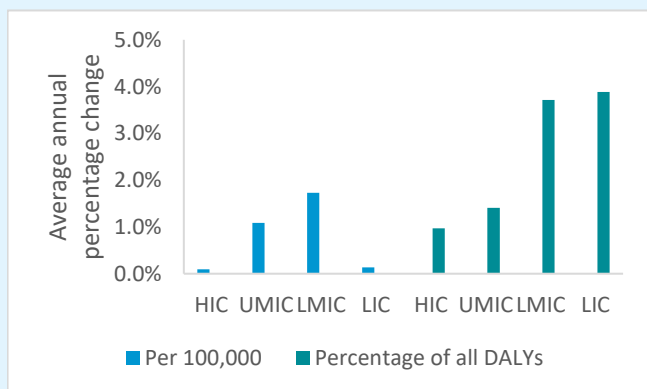
Figure 1 // Disability-adjusted life years (DALYs) lost due to diets high in sugar-sweetened beverage consumption, 2019



Note: Groups are high-income (HIC), upper-middle-income (UMIC), lower-middle-income (LMIC), and low-income countries (LIC).

Source: GBD (2019)

Figure 2 // Average annual percentage change in DALYs lost due to diets high in sugar-sweetened beverage consumption, 2010-2019



Note: Groups are high-income (HIC), upper-middle-income (UMIC), lower-middle-income (LMIC), and low-income countries (LIC).

Source: GBD (2019)

Figure 1 shows the disability-adjusted life years (DALYs) lost due to diets high in SSB consumption in 2019 and Figure 2 shows the average annual percentage change in the same between 2010 and 2019, stratified by country income group. The data show a clear income gradient with DALYs rising as countries get richer, however, the data also show a clear trend with respect to growth, with DALYs rising faster in poorer countries than richer countries.⁴ While estimates vary by country, there is consensus that medical and economic costs associated with obesity are staggering and it is estimated that these costs will reach upwards of \$4.3 trillion (2.9% of GDP) worldwide by 2035 (Okunogbe et al. 2022).

As SSBs are estimated to be one of the largest contributors to added sugars intake (Bowman 2019a, 2019b) and have little or no nutritional value (WHO 2022), and there is a link between SSB consumption and NCDs and associated costs, SSBs are considered prime contenders for health taxes from a public health perspective. In the context of a health tax, data from the World Bank Global SSB Tax Database show that SSB taxes are currently in place in more than 94 countries worldwide of which 20 apply only to SSBs with the remainder applying to other forms of non-alcoholic beverages in addition to SSBs (World Bank 2023d).⁵ As noted above, the economic framework for implementing such a tax is that individuals overconsume SSBs due to the fact that the market does not take into account negative externalities (e.g., healthcare and productivity costs) and there are individual internalities (e.g., inconsistent time preferences related to morbidity and mortality) associated with consumption (Chaloupka, Powell and Warner, 2019). Further, research has shown that SSBs have increasingly become more affordable which, in turn, through leading to increased consumption can contribute to a rise in the prevalence of obesity and NCDs (Blecher et al. 2017; Ferretti and Mariani 2019). Thus, an SSB tax can be thought of as a corrective tool, often referred to as a Pigouvian tax, that by way of increasing prices (known as tax pass-through) can reduce harmful levels of demand.

To design an effective SSB tax policy, it is important to undertake country-specific situational analyses, consider the country's tax environment and administration capacity, and take into consideration the transition mechanism (Figure 3) through which taxes impact consumption and health outcomes. As noted above, in order for health taxes to impact consumption and yield optimal health benefits, SSB prices must increase by a sufficient amount to account for both consumption-related externalities and internalities (Allcott, Lockwood and Taubinsky, 2019). The amount by which prices ultimately increase will depend on the tax amount, pass-through and design. Additionally, substitution for other potentially harmful products and tax-avoidance behaviors (such as cross-border shopping) must be minimized so that they do not create leakage and offset improvements in health. Relatedly, such leakage would lower the estimated socially optimal tax amount

⁴ This trend is not observed in low-income countries where the contribution to all DALYs is rising rapidly, while per capita DALYs are not. This highlights the relative growth due to rapid gains in other areas of public health, particularly infectious diseases.

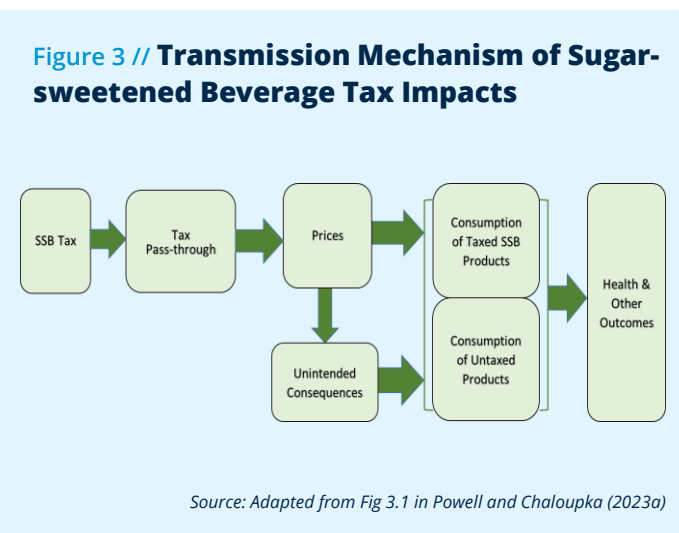
⁵ Non-alcoholic beverages are all packaged or commercial beverages which do not have alcohol, this includes SSBs, but also artificially sweetened beverages, dairy drink, and water.

(Allcott, Lockwood and Taubinsky, 2019). In addition to the transition mechanism shown in Figure 3 through price, SSB tax designs where the tax amount is based on sugar content may also induce supply-side product changes such as reformulation to reduce sugar content in beverages which, in turn, may yield health benefits. Finally, revenues generated from an SSB tax may help to fund programs and policies that provide complementary improvements in population health.

The World Health Organization (WHO) has classified SSB taxes as a cost-effective intervention alongside other policy interventions to reduce unhealthy diets for prevention and control of major NCDs; this is similar to tobacco and alcohol taxes as being cost-effective policies to reduce tobacco use and the harmful use of alcohol (WHO, 2022a). SSB taxes are well supported by a broad range of institutions with both the WHO and the International Monetary Fund, in addition to the World Bank, recommending the use of SSB taxes (World Bank 2020; Petit, Mansour, Wingender 2021; WHO 2022b).

2. EVIDENCE ON SSB TAX IMPACTS

As shown in Figure 3, the key mechanism through which health taxes impact demand is that they raise prices faced by consumers for products targeted by the tax, known as tax pass-through. In turn, the increase in the relative prices of the taxed products is expected to reduce the quantity demanded. This is often measured by a common metric referred to as the price elasticity of demand, the percentage change in quantity demanded that results from a one percent change in price.



A. Tax Pass-Through and SSB Prices

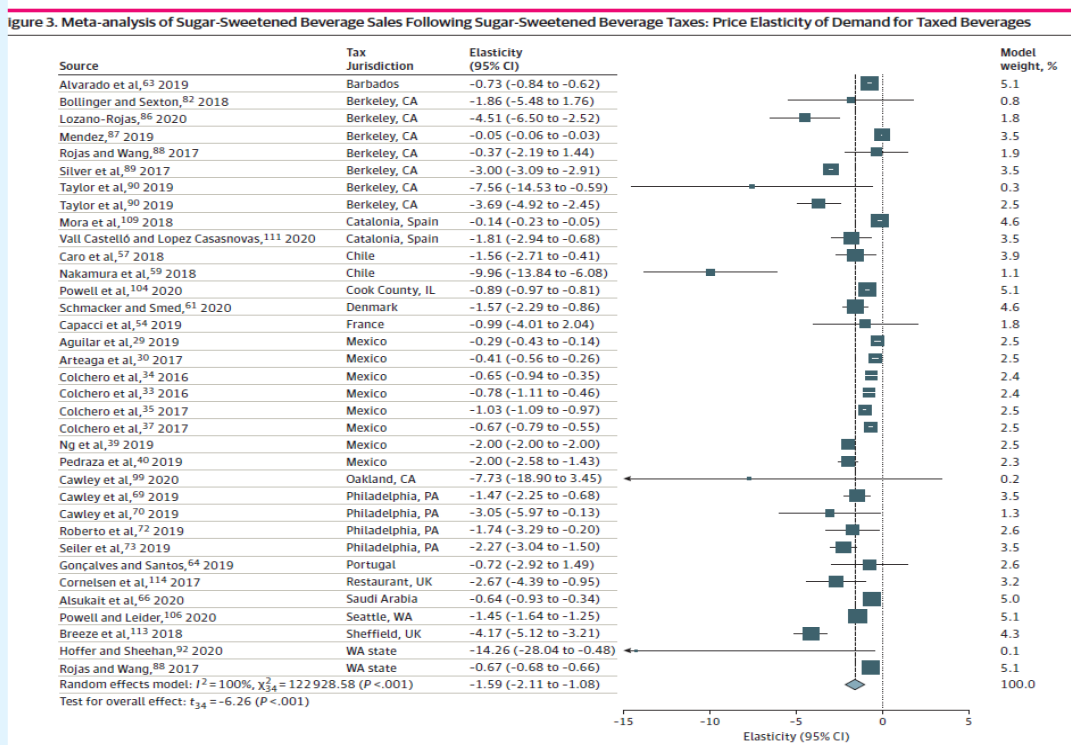
While a number of different factors related to a country's SSB market structure, demand for and supply of SSBs, along with manufacturer and retailer strategic behaviors can influence the extent of tax pass-through (Chaloupka, Warner and Powell 2019; Belloni and Sassi 2023), a growing body of literature has shown that SSB taxes have generally been passed on to consumers in the form of higher prices. A recent meta-analysis of worldwide studies that examined changes in SSB prices following the introduction of an SSB tax found that the tax pass-through rate was, on average,

82% (Andreyeva et al. 2022). It is important to note that the extent to which SSB prices increase can also be dependent on the type of tax that is implemented. Of note, specific excise taxes generally raise the prices of SSBs at a consistent amount per volume metric, whereas ad valorem taxes raise prices by a lesser amount per volume on larger package sizes that are offered at volume discounts. It is also important to keep in mind that, because SSB taxes are often levied on manufacturers or distributors, an ad valorem tax of a given percentage, even when fully passed through, will not raise prices faced by consumers by the equivalent percentage of the retail price since it is levied earlier in the distribution chain on the pre-markup price.

B. Demand for SSBs

Evaluations of SSB taxes have also produced a significant body of literature on the impact on the demand for these beverages. A recent meta-analysis of estimates from SSB tax evaluations worldwide (Figure 4) found that across all studies and tax policies there was a 15% reduction in SSB sales, with a corresponding estimated price elasticity of demand of -1.59 (Andreyeva et al. 2022). An earlier meta-analysis that combined worldwide studies of sales, purchases and intake to examine impacts on consumption found that a SSB tax of 10% was associated with a 10% reduction in consumption, equivalent to an estimated elasticity of -1.0 (Teng et al. 2019). Meta-analyses of SSB tax evaluations that included studies of sales and consumption for the Region of the Americas found a consistent estimate of SSB tax/price elasticity of demand of -1.36 (PAHO 2020). Thus, a SSB tax that raises prices by 40% is expected to reduce demand by approximately 40-64%. These estimated elasticities of demand for SSBs (which are found to be elastic, i.e., elasticity >1) are larger than what has been found for tobacco and alcohol (which are found to be inelastic, i.e., elasticities, on average, for both <1); meaning that taxes that raise SSB prices by a given percentage will result in relatively larger reductions in demand for SSBs compared to respective impacts on demand related to similar tax increases for tobacco and alcohol products (Powell and Chaloupka, 2023a). While these expected impacts on demand are good from a public health vantage point, they also have implications for raising revenue given that the tax base will shrink more quickly as tax rates rise. Nonetheless, this is not presently much of a concern because SSB taxes are generally new and/or low providing a significant time horizon to generate potential revenue associated with increased taxes (Powell and Chaloupka, 2023b). This latter point is discussed in more detail in the section on tax revenue below.

Figure 4 // Price elasticity of demand of SSB taxes



Source: Andreyeva et al. 2022

C. Unintended Substitution to Untaxed

Products and Tax Avoidance

While the intended impact of an SSB tax is to reduce SSB consumption/sugar intake and induce substitution to healthier beverages such as water or low-fat milk without added sugars, there is concern regarding potential substitution to untaxed products that may dampen the intended health benefits of the tax. This includes substitution for beverages that are often excluded from the tax base, such as 100% fruit juices which contain naturally occurring free sugars and flavored milks with added sugars. Overall, evidence from meta-analyses of tax evaluations shows no statistically significant substitution to untaxed beverages including those with and without added sugars; however, some studies do find substitution to untaxed beverages, particularly water, in a number of jurisdictions, including, for example, Mexico, Barbados, and some localities in the United States (U.S.) (Teng et al. 2019; Andreyeva et al. 2022). Additionally, evidence suggests that some substitution may occur to untaxed foods that may be high-sugar substitutes, but that such substitution is not likely to substantially offset the overall impact of the tax. For example, one study examined the net impact of the U.S. Seattle SSB tax on overall grams of sugars sold from SSBs after accounting for changes in grams of sugars sold from substitution to untaxed beverages, standalone sugars and sweets and found that at 2-years post-tax net grams of sugars sold from SSBs fell by 19%, compared to 23% without accounting for substitution (Powell, Leider and Oddo 2021). Only a few studies have examined substitution to alcoholic beverages following the implementation of an SSB tax and have generally found limited to no substitution (Gibson et al. 2021; Powell and Leider 2022).

For sub-national taxes and countries with soft borders, it is important to take into consideration that tax avoidance through cross-border shopping, where consumers shift making purchases to outside of the taxing jurisdiction, can undermine the impact of the tax. While consumption data capture the net effect of the tax from all sources, sales data only reflect changes in the taxing jurisdiction. Evidence from meta-analysis of U.S. studies of local-area SSB taxes that are more susceptible to cross-border shopping compared to national-level taxes shows that, on average, based on studies that used store scanner data, approximately one-quarter of the estimated reduction in demand was offset by cross-border shopping: the reduction in volume sold of taxed beverages fell from an average of 25% to 18% and the estimated price elasticity fell from -1.51 to -1.05 after adjusting for cross-border shopping (Powell et al. 2021). Tax avoidance in the form of cross-border shopping can also be a threat to national-level taxes with soft borders; for example, with respect to the 2014 repeal of the Danish SSB tax (Schmacker and Smed 2020); and, indeed it was raised as an important issue for policy learning among SSB tax policymakers in the European Union region (Thow et al 2022).

D. Economic and Distributional Considerations

A concern frequently raised by industry when SSB taxes are being proposed is that they will lead to job losses. However, it is important to keep in mind that when consumers reduce their purchases of SSBs they will reallocate their spending to other goods and services, including untaxed products from the same beverage industries, and governments will spend the revenue generated by the tax (Mounsey, Powell and Chaloupka

2023). Studies of employment and unemployment outcomes following the introduction of SSB taxes in Mexico, Peru and two local jurisdictions in the U.S. have found no impact on jobs or unemployment claims, including in industries that produce and sell SSBs (Guerrero-López et al 2017; Lawman et al. 2019; Marinello et al, 2021a, 2021b; Diaz et al. 2023).

A further argument that has been raised against SSB taxes is that they will adversely impact lower-income populations. Indeed, while consumption taxes can be regressive because lower-income individuals spend a higher share of their income on consumption, from a health tax perspective they can be considered progressive for several reasons. First, and importantly, health taxes are intended to improve population health by reducing consumption. Low-income individuals tend to be more price sensitive and so are likely to be more responsive to the tax and reduce their consumption to a greater extent. They therefore garner a relatively higher health improvement and, therefore, a commensurate benefit. Price studies (Claro et al. 2012) and tax evaluations (Colchero et al. 2016, 2017; Ng et al. 2019) have shown larger price/tax-related reductions in SSB demand among lower- versus higher-income populations. Second, SSB taxes have the potential to improve health equity, given that some within-country studies have shown that lower-income individuals are relatively heavy SSB consumers, and SSB consumption and obesity are increasing at a relatively high rate in low- to middle-income countries (Han and Powell 2013; Baker et al. 2020). Finally, it is also important to note that SSB tax policies could be linked to complementary programs targeting health and well-being that support low-income populations to further improve health equity.

As an example, World Bank research using an Extended Cost Benefit Analysis (ECBA) shows that SSB taxes can be fiscally progressive in the long run when the behavioral effects of reduced consumption are accounted for (Fuchs and Pierola, 2022). The ECBA model highlights the common argument against health taxes that they are regressive since the burden of the tax increase falls disproportionately on the poor and notes that it is a narrow argument that relies on the average rather than marginal tax incidence. Since poorer income groups are relatively more elastic than richer income groups the anticipated change behavior is larger in poorer than richer income groups. Furthermore, savings in avoided health costs and increases in labor productivity and extended working life disproportionately favor the poor thereby making SSB taxes progressive in the long run. This has been demonstrated, for example, in Kazakhstan using the ECBA methodology (Fuchs et al 2020).⁶

⁶ In addition to the World Bank studies, there are other published studies with similar results from South Africa (Saxena et al., 2019) and the United States (White et al., 2023).

⁷ This has some overlap with sugar content-based tiers discussed in the following sections, but the nuance is that the tax rates do not vary by sugar content (even if sugar content may be broadly generalizable within categories and differ between), but rather by category definitions that are not determined by sugar content.

TAX DESIGN

There are a number of important tax design considerations that need to be taken into account in order to maximize the effectiveness of SSB taxes. This includes decisions related to the following questions: 1) What is the scope of SSB products that will be taxed? 2) What type of tax will be applied to the SSB products? 3) How will the tax be structured (that is, will it be uniform, or tiered)? 4) What will the tax rate be? 5) What is the expected tax revenue?

A. Scope of the tax

Given the public health objective of an SSB tax is centered on reducing consumption and related intake of added sugars with the ultimate goal of reducing health risks such as type 2 diabetes and obesity, it is critically important to consider the scope of the tax, i.e., the set of products to which the tax applies, with reference to all types and forms of SSBs. That is, the scope should consider all water-based beverages with added sugars (carbonated drinks, energy drinks, sports drinks, fruit or vegetable drinks), sugar-sweetened coffee drinks, coffee substitutes, tea and herbal infusions (teas/coffees), and sugar-sweetened milks and dairy-based drink products (sugar-sweetened/flavored milks and yogurt drinks). Additionally, given that all forms of free sugars are considered a risk factor for NCDs, it is recommended that 100% fruit juice (which contains naturally occurring free sugars though no added sugars) be added as part of the scope of taxable beverages (WHO 2015; WHO 2022b). It is also important that all forms of beverages be taxed; that is, not only should liquid forms be taxed but also concentrates, powders, and syrups used to make SSBs by adding water or carbonated water.

A secondary consideration of the scope of the tax is not just which beverages to include or exclude from the tax, but also whether to levy different tax rates on different categories of beverages either based on beverage types or sugar content.⁷ These points are discussed in more detail below. In Croatia, for example, taxes on energy drinks containing taurine or methyl-xanthine (at least 15mg per 100ml) are taxed at a higher rate than other SSBs.⁸

B. Tax type

As introduced above, health taxes are excise taxes imposed on products that have a negative public health impact, e.g., taxes on tobacco, alcohol, and SSBs. The term health taxes almost always refers to excise taxes. Consumption taxes are considered indirect taxes and, in addition to excise taxes, they include value-added taxes, goods and services taxes and other general sales taxes. However, sales taxes when they are uniform across products are not considered health taxes since they do not change the relative prices of targeted products and reduce consumption through increased cessation, reduced

⁸ SSBs are taxed on a tiered system with rates of €1.33 per hL (sugar content of 2.001g to 5g per 100ml), €3.98 per hL (sugar content of 5.001g to 8g per 100ml), and €7.96 (sugar content exceeding 8g per 100ml). Tax rates on energy drinks are of €26.54 per hL (containing taurine) or €10.62 per hL (at least 15mg per 100ml of methyl-xanthine).

initiation, and intensity of use. When sales taxes are differentiated, they function somewhat like excises, although they are not viewed as good practice for several reasons. For example, the tax structure would be limited to ad valorem taxes, they may have a limited impact on price, and they introduce administrative complexities into the sales tax system.⁹ Import tariffs are also generally not considered health taxes since they influence where something is produced rather than where it is consumed; that is, they do not tax locally produced products and hence are not comprehensive taxes (World Bank 2023a). Given that SSB taxes are designed to be applied to a relatively narrow range of products in order to induce larger price differentials between them, an excise tax is the most appropriate tax.

Excise taxes can be applied as a specific tax (e.g., levied on the volume or any physical characteristics of the beverage or sugar) or as an ad valorem tax (e.g., levied as a percentage of value). Specific taxes are generally the preferred type of tax on products that generate negative externalities and internalities like SSBs, because the externalities and internalities correlate with the volumes of consumption rather than the value. For example, a cheaper SSB does not generate smaller externalities and internalities than a more expensive SSB. Specific taxes also have a number of advantages over ad valorem taxes in terms of achieving goals of reducing consumption (Powell and Chaloupka 2023b). Because specific taxes are applied per unit (either volumetric units or sugar content) rather than as a function of value, quantity discounts are still taxed at the same rate; this is important because an ad valorem tax could induce consumers to substitute to larger sized beverage bottles and/or cases of beverages. Additionally, specific taxes reduce the incentive for consumers to switch to less expensive brands. Specific taxes are less susceptible to industry manipulation in the form of under-invoicing or transfer pricing where manufacturers set lower prices at the point of tax application and then increase prices later in the distribution chain. This makes tax administration of specific taxes generally easier than ad valorem taxes and improves the stability of tax revenue since they are not subject to industry price manipulation. However, it must be noted that specific excise taxes must be adjusted regularly to account for changes in real income and inflation otherwise their impact will be eroded over time (World Bank 2023b).¹⁰

C. Tax base and structure

Specific taxes can be based on either the volume of the beverage or the volume of sugars (i.e., content), while ad valorem taxes can be based on a value early in the supply chain (e.g., CIF or ex-factory prices) or later in the supply chain (e.g., retail prices or retail prices net of taxes). Both specific and ad valorem taxes can be structured to apply as uniform taxes (i.e., at a single rate) or with a tiered rate that

varies based on the product's characteristics (i.e., level of sugars) or price. The choice of the tax base and structure can have significant impacts on the policy transmission mechanism. For example, the earlier in the value chain that the ad valorem tax is based, the smaller the impact on retail prices, which is not the case for specific excise taxes. Uniform taxes are generally easier to administer, however, tiered taxes based on sugar levels and specific taxes based on sugar content can provide incentives for consumers to shift away from the most sugar-laden products and incentives for firms to reduce sugars in beverages overall. This is best explained by considering several country examples.

Mexico applies a volumetric specific tax of MXN 1 per liter of beverage, whereas South Africa applies a specific tax of ZAR 0.021 per gram of sugars per 100ml. In addition to tiers, the sugar content can also be used to define tax thresholds (a level below which tax is not paid). South Africa applies a threshold of 4g per 100ml, meaning that only SSBs with 4g or more of sugars per 100ml are subject to the tax. Mexico does not apply a threshold, but Hungary is an example of a volumetric specific tax that is applied above a threshold. The tax is levied at a rate of HUF 15 per liter for SSBs containing at least 8g of sugars per 100 ml. The United Kingdom (U.K.) also applies a volumetric specific tax (GBP 0.18 per 100ml) and imposes multiple thresholds: a threshold of 5g of sugars per 100ml for the first tax amount and it applies a higher rate (GBP 0.24 per 100ml) at a second threshold for SSBs exceeding 8g of sugars per 100ml. Figure 5 shows the impact of these tax structure choices on the effective tax relative to sugar content by converting these four examples into common units and currency.

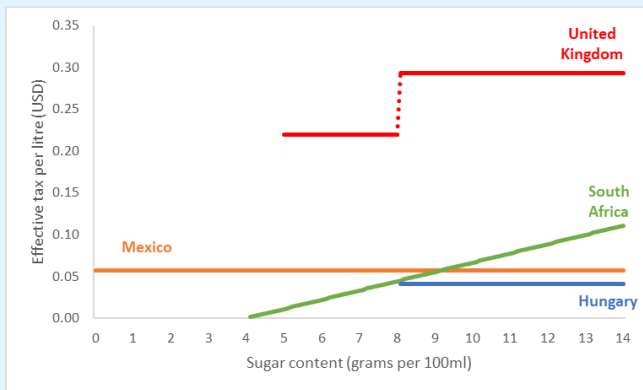
Figure 5 also highlights the incentives of the different tax structures. The volumetric tax in Mexico does not generate any incentives for producers to lower sugar content since the same tax applies no matter the sugar content. However, it generates incentives for consumers to switch from taxed to untaxed beverages since the prices of taxed beverages will increase relative to untaxed beverages. The threshold in Hungary generates incentives for producers to lower sugar content in a dichotomous manner. If producers reduce sugar content below 8g of sugars per 100ml they pay no tax, otherwise they pay the tax no matter the sugar content. Beverages already containing less than 8g have no incentive to reformulate or increase prices since they are not subject to the tax, while drinks with 8g or more have an incentive to reduce to 7.9g, but no more.

⁹ A hallmark of modern sales taxes like VAT are that they are as uniform as possible. Introducing exceptions with graduated rates undermines the efficiency of these systems by increasing the administrative burden.

¹⁰ The World Bank Global Tax Program recently published a [Knowledge Note on "Health Taxes and Inflation"](#) (World Bank 2023b) that provides

policy makers an overview of relevant issues and feasible policy choices in setting health taxes, including SSBs, in the context of rising inflation. It provides practical solutions to protect the real value of taxes and tax revenues, including benchmarking of specific taxes.

Figure 5 // SSB tax rates per gram of sugars in Hungary, Mexico, South Africa, and the United Kingdom



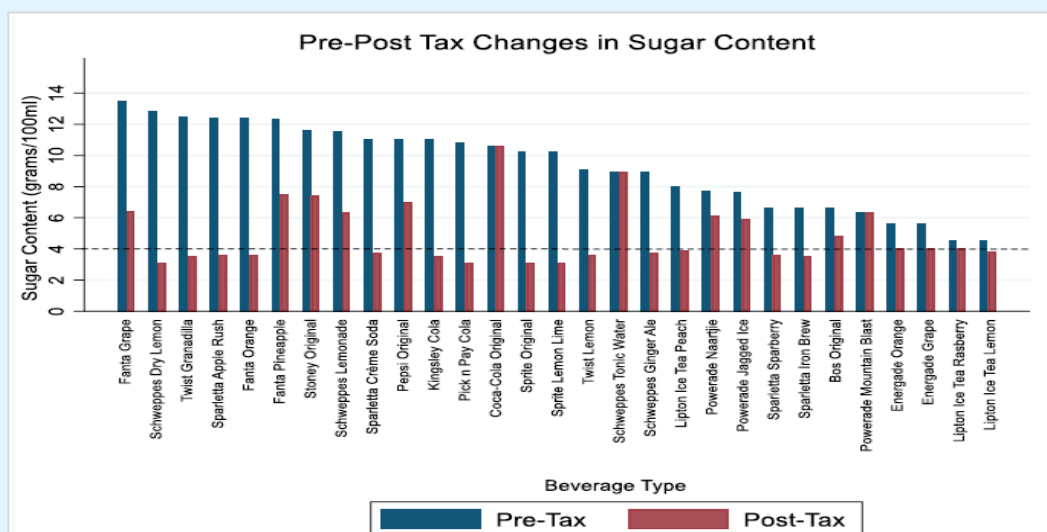
Source: World Bank Global Tax Program estimates

The South African tax structure generates two incentives for producers to reduce the sugar content to reduce their tax liability, through the tax as a continuous function of sugar content (i.e., ZAR 0.021 per gram of sugars per 100ml) and the threshold below which they do not have any tax liability. Research shows that the incentives have generated reactions from firms. Of 30 of the most popular taxed SSBs, 18 reduced sugar content to below the 4g threshold to avoid the tax entirely, 9 reduced sugar content but remained above the threshold thereby partially reducing their tax liability, while only 3 did not alter their sugar content (see Figure 6; Heneck, 2022). The impact has been a significant reduction in sugar consumption, from SSBs with the majority of SSBs reducing sugar content to lower their tax liability, partially or fully. Research conducted using household scanner data found a 32 percent decrease in sugar consumption from beverages, of which reformulation accounted for a third of the change.

Not all the impact was on the supply side, with changes in consumer behavior accounting for two-thirds of the change through substitution to lower-sugar beverages and a reduction in total SSB consumption (Bercholz et al., 2022). The reduction in sugar consumption from SSBs is also corroborated by tax data, which shows a reduction in tax revenue of 30 percent between the 2018/19 and 2021/22 fiscal years even though the tax rate has remained unchanged (National Treasury, 2022).¹¹

In the U.K., the threshold and tier apply two discrete incentives, rather than the linear incentive like in South Africa. Evaluation of the tax shows that manufacturers engaged in significant product reformulation to lower sugar content to reduce their tax liability. Furthermore, the U.K. provided producers with a significant lead time of nearly two years between the announcement (early 2016) and implementation (April 2018) with the intention of giving firms time to develop and implement reformulation strategies. As shown in Figure 7, many producers began reformulating immediately after the announcement and most products that were to reformulate had done so before the implementation of the tax, while a large number also reformulated at the time of implementation (Scarborough et al. 2020). Evidence shows that two years post-tax implementation there was an 11% reduction in the content of sugars of SSBs subject to the levy, and the caloric content of such SSBs fell by 6% (Public Health England 2018). While there was a reduction in sales of high-sugar beverages which fell 40% (due to both reformulation and the impact of the tax) there was an increase in the intake of low-sugar drinks (Bandy et al 2020). Therefore, it is important for tiered structures to maintain relatively high tax rates on lower-sugar beverages. In another evaluation, evidence shows that one year after implementation, although the overall volume of soft drinks purchased did not change, the amount of sugars from

Figure 6 // PRE- AND POST-TAX CHANGES IN SSB SUGAR CONTENT IN SOUTH AFRICA

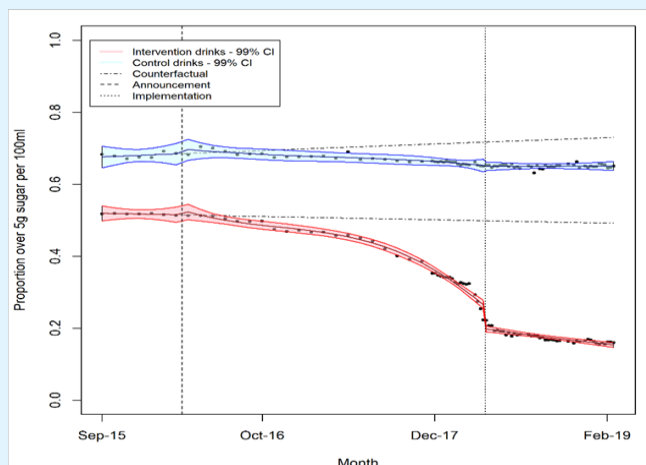


Source: Heneck (2022)

¹¹ Since the tax is a specific tax based on the sugar content, the reduction in revenue coincides with the reduction in sugar consumed, but only above the threshold.

drinks purchased was 10% lower per household per week (Pell et al. 2021).

Figure 7 // Proportion of SSBs with sugar content exceeding 5g of sugars per 100ml in the United Kingdom before and after implementation



Source: Scarborough et al. (2020)

D. Tax revenue

SSB taxes have the potential to generate significant additional revenue, particularly when a new SSB tax is being introduced. In most cases, SSB taxes generate less revenue than tobacco and alcohol taxes. While SSB tax revenue data are not as widely available as for other taxes as fewer countries implement them, data for 23 countries show that SSB taxes (sometimes including non-alcoholic beverage taxes), average 0.07 percent of GDP, with a maximum of 0.19 percent of GDP.¹² This is compared to an average of 0.6 and 0.3 percent of GDP for tobacco and alcohol, in 81 and 78 countries, respectively (World Bank 2023c).¹³ The lower magnitude of revenue is due to relatively lower tax rates, greater price elasticity of demand, often narrow scope of the tax¹⁴, and tax structures that generate more supply-side responses. Revenue is not the only consideration though. The relatively elastic demand that results in a smaller revenue yield means that SSB sales volumes will decline more than alcohol or tobacco for the same tax (and related price increase), increasing the potential health impact of the tax.

The smaller total revenue yield does not consider tax buoyancy. Since most countries do not implement an SSB tax, establishing a new tax may generate significant revenue, potentially more than from increasing existing

excise taxes. For example, in South Africa, the tax revenue generated by the SSB tax in its first year (R 3.2 billion in 2018/19) amounted the same value as cumulative incremental revenue from tobacco taxes for 6 years (National Treasury, 2023).

Notably, the design influences the revenue yield. Since the tax structure in South Africa generates supply side incentives for manufacturers to reduce their tax liability by reformulating products, the design limits the revenue impact. However, tax structures that do not generate these incentives, like Mexico's uniform specific tax, will generate more significant tax revenue. In the first year after implementation, Mexico's generated approximately 0.09 percent of GDP, compared to only 0.05 percent in South Africa.¹⁵

Tax structures that generate supply side responses may also affect how revenue evolves over time. South Africa and the U.K. are examples of tax designs that influence reformulation, but also how the revenue yield evolved differently over time (see Figure 8). Both countries implemented these SSB taxes in the 2018/19 fiscal year and have not adjusted nominal tax rates since. In South Africa, nominal tax revenues declined from ZAR 3.3 to 2.1 billion between 2018/19 and 2020/21, before rebounding slightly. The decline coincided with a decline in the total volume of sugars (from SSBs with more than 4 grams of sugar per 100ml) from 147 to 110 tons between 2018/19 and 2022/23.¹⁶ This corroborates the data that show a large reduction in sugar content among popular SSB brands to reduce their tax liability.

The U.K.'s tax structure has several similarities, generating incentives for producers to reduce the sugar content to reduce their tax liability. The data from the U.K. do not show a decline in tax revenue. In fact, tax revenue has increased between 2018/19 and 2019/20, but has stabilized since. However, the U.K. announced the tax with a long lead time, nearly two years in advance of the implementation. As Scarborough et al. (2020) noted, much of the reformulation to reduce sugar content occurred well before the implementation of the tax, explaining why tax revenue did not decline after implementation. In fact, the significant market response resulted in a reduction in the official revenue estimate by the authorities before implementation (HM Treasury, 2018). Analysis of revenue trends in countries with SSB taxes that generate reformulation incentives should be done with care to ensure that revenue trends are not misinterpreted to represent policy failures when declining revenue trends may occur by design.

¹² It should be recognized that since SSB taxes are not yet widely implemented and only recently implemented in several countries, broader trends in revenue are not widely established. Furthermore, the range of countries measured in global research is still small and limits the generalizability of results.

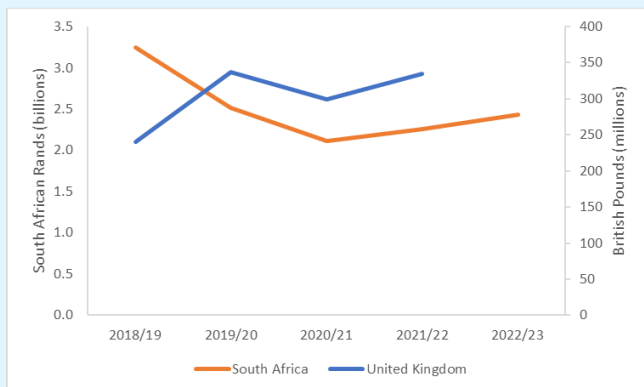
¹³ For a more comprehensive review of tax revenue and health taxes, please see World Bank Global Tax Program's [Knowledge Note "Unpacking the Empirics behind Health Tax Revenue"](#) (World Bank, 2023c).

¹⁴ Of the 20 countries that have taxes on SSBs only, only 7 applied taxes to all six categories of SSBs that the World Bank (2023b) database covers. On the other end of the spectrum, 2 countries only applied to two categories, highlighting the wide variation in scope of tax.

¹⁵ GTP estimates using data reported by SHCP (2016) and National Treasury (2023).

¹⁶ Since the volume of sugar is the tax base, the volume of sugar can be estimated by dividing the tax revenue by the tax. However, since the tax is applied above the threshold, it only measures the sugar consumed above the threshold.

Figure 8 // Nominal tax revenue collected from SSB taxes in South Africa and the United Kingdom



Source: National Treasury (2023); HMRC (2023)

Even in places where SSB taxes exist, increases in such taxes are expected to provide additional streams of revenue given that most current SSB taxes account for relatively low shares of SSB prices (Roche et al 2022), particularly when compared to existing tobacco or alcohol taxes. WHO recommends that tobacco excise taxes account for at least 70 percent of retail prices (WHO, 2021), and evidence shows that excise taxes accounted for 45 percent of cigarette prices in 2018 (and higher in high-income countries) (Powell and Chaloupka 2023b). While alcohol excise taxes are relatively common, they typically account for a lower share of prices (17 percent) compared to tobacco taxes. Worldwide data on SSB tax shares are not available but a recent study of countries in Latin America and the Caribbean found that median excise taxes represented 6.5 percent of the price of carbonated SSBs and 2.3 percent for energy drinks (Roche et al 2022). This is substantially lower than the estimated recommended tax amounts that account for externalities and internalities, with estimates from one study, for example, suggesting that SSB taxes may require increasing retail prices by as much as 40 percent (Allcott, Lockwood and Taubinsky, 2019).

With regard to potential uses for tax revenue, it should also be noted that in some cases with either soft or hard earmarking, the introduction of SSB taxes has also been combined with or led to the adoption of policy reforms that can help to garner public support for SSB taxes and be targeted to complement the health impact of the tax (e.g., programs that focus on reducing diabetes and obesity, or support healthy eating and physical activity). Additionally, targeting these complementary reforms towards lower-income populations can help to offset concerns of regressivity (e.g., subsidies for fruits and vegetables or improving healthy food access in low-income or rural areas

can achieve dual goals of further improving nutrition outcomes and health equity).

E. Tax administration

Effective and efficient implementation of SSB taxes is necessary to ensure that the policy achieves its desired fiscal and health objectives, and appropriate tax administration is essential to ensure this. In many cases, SSB tax administration will be reliant on existing excise tax and/or indirect tax administration systems; however, there are several unique characteristics of SSBs and SSB tax policy design that generate challenges that may require tailored approaches to tax administration or require additional investments in tax administration (Petit, Mansour, Wingender 2021; WHO 2022b):

- Similar to tobacco and alcohol taxes, specific taxes are generally easier to administer than ad valorem taxes. Ad valorem taxes generate incentives for undervaluation, whereas volumes are observable.
- As with other excise taxes, SSB taxes that apply early in the supply chain will provide fewer opportunities for tax evasion activities, and result in collection from a fewer number of taxpayers.
- Differentiated sales taxes should be avoided as additional tax administration issues can arise when these types of taxes are applied at the point of purchase and retailers are not clear about which products are subject to the taxes.
- Countries with limited administrative capacity should consider simpler and less complex tax designs. For example, excise taxes that are uniform across SSB products and sugar content are the most straightforward to apply than taxes with rates that vary based on product characteristics such as type and sugar content.
- Investments may be needed in customs' import systems that use HS codes to identify taxable products to help facilitate the application of SSB taxes at the point of entry for imported products.
- Tax administrative investments are needed to monitor tax evasion and ensure enforcement. The use of technology can be particularly useful in this regard. A potential issue with SSBs taxes is also the administrative complexity of the tax, which may need to be collected from multiple and diverse manufacturers.
- SSB tax administrators should consider coherence across fiscal policies. For example, SSBs should not be exempt as food from other taxes such as VAT or food sales taxes.
- SSB tax administrators should aim for cross-sectoral alignment of SSB tax policies with other SSB policies such as labeling laws and restrictions on beverages offered with kids' meals, etc. in order for policies to appropriately complement each other and, in turn, have the most comprehensive impact on health.

POLICY CONSIDERATIONS

The following considerations should be taken into account when designing SSB excise tax policy:

- Excise taxes are an effective tool for reducing the demand for SSBs and can also be used to instigate supply side changes by generating incentives for manufacturers to reformulate products and reduce sugar content. However, SSB taxes need to be well designed to ensure that they effectively target negative externalities and internalities and achieve the desired health and fiscal impact.
- SSB taxes need to increase prices by an amount that accounts for the negative externalities and internalities of SSBs.
- Specific taxes can be based on either the liquid volume of the beverage or the grams of sugars per beverage volume, while ad valorem taxes can be based on a value early or later in the supply chain. Applying the tax to the amount of sugars can generate incentives for consumers to shift away from the most sugar-laden products, as well as incentives for manufacturers to reformulate products to reduce sugar content.
- Both specific and ad valorem taxes can be structured to apply as uniform taxes or with a tiered rate that varies based on the product's characteristics. Tiers based on value may not be effective in generating strong health and fiscal outcomes, however tiers based on sugar content can provide incentives for consumers to shift away from the most sugar-laden products, as well as incentives for manufacturers to reformulate products to reduce sugar content.
- Specific taxes are more effective than ad valorem taxes in targeting negative externalities and internalities and generate stronger health and fiscal outcomes.
- Specific taxes are generally easier to administer than ad valorem taxes, and uniform taxes are easier than tiered taxes. Taxes based on sugar levels – whether uniform or through tiers – can be more complex to implement than those based on the beverage volume.
- SSB taxes also have the potential to generate meaningful additional revenue, particularly when a new SSB tax is being introduced.

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