

**Calculating Standardized Tax Share and Other Price and Tax Policy
Indicators for Sugar-Sweetened Beverages in Latin America and the
Caribbean**

Methodological Note

Calculating Standardized Tax Share and Other Price and Tax Policy Indicators for Sugar-Sweetened Beverages in Latin America and the Caribbean

Methodological Note



Washington, D.C.

2021

Calculating Standardized Tax Share and Other Price and Tax Policy Indicators for Sugar-Sweetened Beverages in Latin America and the Caribbean: Methodological Note

PAHO/NMH/RF/21-0029

© Pan American Health Organization, 2021

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO license (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this license, this work may be copied, redistributed, and adapted for non-commercial purposes, provided the new work is issued using the same or equivalent Creative Commons license and it is appropriately cited. In any use of this work, there should be no suggestion that the Pan American Health Organization (PAHO) endorses any specific organization, product, or service. Use of the PAHO logo is not permitted.

All reasonable precautions have been taken by PAHO to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall PAHO be liable for damages arising from its use.

Contents

Acknowledgments	iv
1. Background and objective	1
2. Definition of the scope of the tax share indicator	3
2.1 Types of taxes considered	3
2.2 Types of non-alcoholic beverages considered.....	5
3. Data collection and analysis	7
3.1 Survey process and validation	7
3.2 Analysis of tax legislation.....	7
3.3 Collection of nominal final retail prices	8
4. Estimation of the proportion of indirect taxes in the final retail price	11
4.1 Calculating the share of VAT or sales taxes in the final retail price	11
4.2 Calculating the share of amount-specific excise taxes in the final retail price	12
4.3 Calculating the share of ad valorem excise taxes in the final retail price	12
4.3.1 Locally produced beverages	13
4.3.2 Imported beverages.....	14
4.4 Calculating the share of import duties in the final retail price.....	15
4.4.1 Amount-specific import duties	16
4.4.2 Ad valorem import duties.....	16
4.5 Calculating the share of other taxes in the final retail price	16
4.5.1 Amount-specific other taxes.....	17
4.5.2 Ad valorem other taxes	17
5. Additional price and tax policy indicators	18
5.1 Excise tax share.....	18
5.2 Affordability indicator	18
5.3 Price dispersion indicator	19
5.4 Tax policy indicators	19
5.5 Excise tax revenue and earmarking	21
6. Methodological limitations and other considerations	22
7. References	24

Acknowledgments

This methodological note was prepared by the Risk Factors and Nutrition Unit from the Department of Noncommunicable Diseases and Mental Health at the Pan American Health Organization (PAHO), under the supervision of Rosa Sandoval, Regional Advisor for Tobacco Control and Coordinator of the Economics of NCDs team, and Fabio da Silva Gomes, Regional Advisor for Nutrition and Physical Activity.

Maxime Roche, Economics of NCDs Consultant, supported the development of the indicators and led the elaboration of this methodological note. Guillermo Paraje, Universidad Adolfo Ibanez, and former members of the Risk Factors and Nutrition Unit, Itziar Belausteguigoitia, Luis Galicia, and Miriam Alvarado, participated in the development of the indicators and supported the project in its early stages.

Comments received from the following peer-reviewers are greatly acknowledged: Katrin Engelhardt, World Health Organization (WHO); Kaia Engesveen, WHO; Roberto Iglesias, WHO; Guillermo Paraje, Universidad Adolfo Ibanez; Anne-Marie Perucic, WHO; and Kevin Welding, Johns Hopkins Bloomberg School of Public Health.

Special thanks to the Latin American and Caribbean Ministry of Finance officials, researchers, partners, and PAHO/WHO staff who participated in and contributed to the Meeting to Develop a Standardized Tax Share Indicator for Alcoholic and Sugar-Sweetened Beverages, which was organized by PAHO's Risk Factors and Nutrition Unit in Washington, D.C., 24–25 July 2018.

PAHO acknowledges support from the Global Health Advocacy Incubator and funding from Bloomberg Philanthropies.

1. Background and objective

The WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020 (WHO Global Action Plan) recognizes the critical importance of reducing the level of exposure of individuals and populations to common risk factors of noncommunicable diseases (NCDs), including tobacco, alcohol, unhealthy diet, and physical inactivity (1). As part of ensuring a healthy diet, the World Health Organization (WHO) recommends limiting the intake of free sugars to less than 10% of total energy intake, with additional health benefits from further reduction to less than 5% of total energy intake. Consumption of free sugars increases the risk of dental caries (tooth decay). Excess calories from foods and drinks high in free sugars also contribute to unhealthy weight gain, which can lead to overweight and obesity. Recent evidence also shows that free sugars influence blood pressure and serum lipids, and suggests that a reduction in free sugars intake reduces risk factors for cardiovascular diseases (2). Intake of free sugars can be reduced by limiting the consumption of foods and drinks containing high amounts of free sugars, for example sugary snacks, candies, and sugar-sweetened beverages (SSBs).

SSBs include all types of beverages containing free sugars, such as carbonated or non-carbonated soft drinks, fruit or vegetable juices and drinks, liquid and powder concentrates, flavored waters, energy and isotonic drinks, ready-to-drink teas, ready-to-drink coffees, and sugar-sweetened milk drinks and yogurts. Their consumption is associated with weight gain in children and adults, increased incidence of type 2 diabetes, cardiovascular disease, dental caries, and osteoporosis (3).

Evidence indicates that as prices increase for tobacco, alcoholic beverages, and SSBs, the affordability, purchase and consumption of these products decrease. Thus, taxation is an indirect tool to influence the prices of these products, and thereby reduce their affordability and discourage their purchase and consumption. Taxing SSBs is proposed as a policy option to support a reduction in consumption of free sugars in accordance with the WHO guideline on sugars intake (2). Moreover, effective taxation on SSBs, such as on tobacco and alcoholic beverages, is outlined in the updated Appendix 3 of the WHO Global Action Plan as a recommended cost-effective regulatory policy to prevent NCDs (4, 5). Such taxes represent a triple win for governments, because they 1) improve population health, 2) generate revenue, and 3) have the potential to reduce long-term associated healthcare costs and productivity losses (3).

Since 2008, WHO has calculated and published a standardized indicator to compare tobacco tax share levels (proportion of total indirect taxes in the final retail price) across all Member States and time (6). Comparable information on taxation of alcoholic beverages and SSBs over time and across countries is not currently available. Nonetheless, developing such indicators is necessary for monitoring tax policies recommended in the WHO Global Action Plan, as well as for analyzing trends, enabling standardized comparisons across countries, establishing best practices, and providing a powerful tool for advocacy.

In 2016, the Department of Noncommunicable Diseases (NMH) of the Pan American Health Organization (PAHO) started working on developing standardized and comparable indicators of the share of indirect taxes in the price of alcoholic beverages and SSBs across time and countries in Latin America and the

Caribbean. In 2017, PAHO/NMH piloted the calculation of two tax share indicators for 10 countries¹ in Latin America and the Caribbean, the first for one liter (1 L) of the locally-produced most sold brand of carbonated SSB and the second for 1 L of the locally-produced most sold brand of beer. PAHO/NMH convened researchers and ministries of finance for a two-day meeting in July 2018 to present its pilot results and receive feedback on its proposed methodology, discuss the progress and challenges in monitoring and evaluating taxation policies, and establish a roadmap to periodically collect tax legislation and prices and calculate tax share indicators for alcoholic beverages and SSBs in Latin America and the Caribbean. The participants provided valuable inputs on how to strengthen the proposed tax share indicators to adequately capture the intricacies, unique characteristics, and regional consumption patterns of these products (7).

Building on this experience, from March to December 2019, PAHO/NMH conducted a survey on prices and taxes applied on SSBs in all PAHO Latin American and Caribbean Member States (hereafter referred as PAHO SSB tax survey). This survey collected data and information on prices, product characteristics, and taxes in order to develop a tax share indicator and other tax policy and price indicators on selected non-alcoholic beverages.

This note describes the methodology that PAHO developed for estimating a tax share indicator and other tax policy and price indicators for selected non-alcoholic beverages, based on the methodology used by WHO to monitor prices and taxes applied on tobacco products since 2008 (8). It outlines the definition of the scope and beverages for which the tax share is calculated; a description of the data collection and analysis process; and an explanation of key components of the tax share calculation. It also defines additional indicators on prices, affordability, and tax policies. Through this exercise, PAHO aims to provide Member States with accurate, relevant, and internationally comparable information that they can use to guide the development of taxes on SSBs and evaluate their impact.

¹ Three Caribbean countries: Barbados, Jamaica, and the Republic of Suriname; and seven Latin American countries: the Federal Republic of Brazil, the Republic of Chile, the Republic of Colombia, the Republic of Ecuador, the United Mexican States, the Republic of Peru, and the Eastern Republic of Uruguay.

2. Definition of the scope of the tax share indicator

The first step in developing the methodology is to establish what types of taxes are to be considered in the calculation of the tax share indicator, along with the beverages for which the tax share is to be calculated. This section describes the rationale behind these decisions.

2.1 Types of taxes considered

From a public health perspective, the objective of taxation policies on NCD risk factor commodities (tobacco, alcoholic beverages, and SSBs) is to reduce their consumption; for this reason, the proposed tax share methodology is limited to indirect taxes. Indirect taxes usually have the most significant impact on the relative price of a product. All information collected about taxes was based on legislation in effect as of March 31, 2019.

Several types of taxes are categorized as indirect taxes, including: amount-specific excise taxes, ad valorem excise taxes, import duties, value-added taxes or sales taxes (VAT), and other indirect taxes. From a public health perspective, within indirect taxes, excise taxes have the greatest potential. They allow policymakers to target and tax selected products (e.g., SSBs) in order to raise their relative price and make them less affordable than other goods and services, such as water, milk, or other non-SSBs (e.g., flavored waters without added sugars or non-sugar sweeteners). Therefore, excise taxes can discourage consumption of unhealthy products by decreasing their affordability, which is the ultimate objective of the use of taxation as a public health tool.

Table 1, extracted from Technical Note III of the WHO Report on the Global Tobacco Epidemic, 2019 and adapted to SSBs², provides a summary of the different types of indirect taxes considered (8). The estimated total share of indirect taxes in the final retail price of a beverage (i.e., the total tax share) is calculated by aggregating the proportion of the final retail price that corresponds to each type of indirect taxes, such that³:

$$\text{Total tax share} = \frac{\text{VAT amount} + \text{Excise taxes amount} + \text{Import duties} + \text{Other taxes amount}}{\text{Final retail price}} \quad (1)$$

Certain other taxes, in particular direct taxes such as corporate taxes, can potentially impact beverage prices to the extent that producers pass them on to consumers. However, because of the practical difficulty of obtaining information on these taxes and the complexity in estimating their potential impact on prices, they are not considered.

² Some changes were made in the examples used to explain the different types of indirect taxes in order to target SSBs.

³ Amount-specific excise taxes and ad valorem excise taxes can be summed up to represent the total amount of excise taxes.

Table 1. Types of indirect taxes considered

Type of indirect taxes	Description
Amount-specific excise taxes	An amount-specific excise tax is a tax on a selected good produced for sale within a country or imported and sold in that country. In general, the tax is collected from the manufacturer or wholesaler or at the point of entry into the country by the importer, in addition to import duties. These taxes come in the form of an amount based on volume or sugar content (e.g., \$1 per L; \$0.20 per 100 grams (g) of sugar).
Ad valorem excise taxes	An ad valorem excise tax is a tax on a selected good produced for sale within a country or imported and sold in that country. In general, the tax is collected from the manufacturer or wholesaler or at the point of entry into the country by the importer, in addition to import duties. These taxes come in the form of a percentage of the value of a transaction between two independent entities at some point of the production/distribution chain, e.g., 10% of the producer's price.
Import duties	An import duty is a tax on a selected good imported into a country to be consumed in that country (i.e., the goods are not in transit to another country). In general, import duties are collected from the importer at the point of entry into the country. These taxes can be either amount-specific or ad valorem. Amount-specific import duties are applied in the same way as amount-specific excise taxes. Ad valorem import duties are generally applied to the CIF (cost, insurance, freight) value, e.g. 50% import duty levied on the CIF value. ⁴
Value-added taxes or sales taxes (VAT)	<p>A value-added tax (VAT) is a “multi-stage” tax on all goods and services applied proportionally to the price the consumer pays for a product/service. Manufacturers and wholesalers participate in the administration and payment of the tax on the value they add in each stage of the manufacturing/distribution chain. They are all reimbursed through a tax credit system, except the final consumer who pays the tax in the end. Most countries that impose a VAT do so on a base that includes any excise taxes and import duties, e.g., VAT is 10% of the value at each stage of commercialization.</p> <p>Some countries impose a sales tax instead of a VAT. Unlike VAT, sales taxes are levied at the point of retail on the total final value of the good or service purchased. For the purpose of the tax share calculations, care was taken to ensure the VAT or sales tax share was computed in accordance with country-specific rules.</p>
Other taxes	Information was also collected on any other indirect tax that is not an excise tax, import duty, VAT or sales tax, but that applies to either the quantity of a product (in volume, weight or number of units) or to the value of a transaction of a product, with as much detail as possible regarding what is taxed and how the base is defined, e.g., environment levy.

Source: Adapted from World Health Organization (2019). Report on the Global Tobacco Epidemic, 2019: Offer help to quit tobacco use. Technical Note III: Tobacco taxes in WHO Member States. Geneva: WHO (8).

Table 1 defines ad valorem and amount-specific excise taxes. Some countries might apply one or the other or a mix or a combination of the two. A mixed tax structure means that both amount-specific excise taxes

⁴ Cost insurance and freight value (CIF): The value of the unloaded consignment that includes the cost of the product itself, insurance, and transport and unloading. The CIF value is used in most countries as the base for import duties and ad valorem excise taxes on imported products.

and ad valorem excise taxes are applied. A combined tax structure means that some products are taxed by an amount-specific excise tax and others by an ad valorem excise tax.

In addition, countries can have either a uniform or a tiered excise tax system. A uniform excise tax system consists of a unique excise tax rate for all taxed beverages compared to a tiered system where variable rates apply based on selected criteria of beverages (type, volume, or sugar content).

2.2 Types of non-alcoholic beverages considered

It is impractical to collect data on all desired beverage types given the high diversity of SSBs consumed in Latin America and the Caribbean. Selection of beverages for this analysis was conducted by the Economics of NCDs and Nutrition teams at PAHO/NMH and through collaboration with researchers and ministries of finance personnel from PAHO Member States.

The criteria for selection of the types of beverages considered for the tax share indicator were: regional patterns of consumption, representativeness, and price dispersion. The two types with the highest market share in volume sold in Latin America⁵ were selected: sugar-sweetened carbonates (hereafter referred as carbonated SSBs) and fruit drinks (<100% juice concentration) (9). In addition, we included energy drinks as their consumption is increasing significantly and they represent an emerging public health hazard (9, 10), and sugar-sweetened milk drinks as they may promote increased energy intake (11). Finally, bottled water was also selected to measure the tax share of a non-SSB, for comparability purposes.

Data were collected on an internationally comparable brand⁶ of carbonated SSB. The same brand was collected in all countries. This brand was selected as it is sold in all countries in Latin America⁷ and it is the most sold brand in the majority of them (9). No single brand for the other beverage types is the most sold in the majority of countries in Latin America and the Caribbean, therefore the decision was made to ask for each country to pick their most sold brand for each beverage type, determining popularity based on national market share information. If this information was not available, survey respondents were asked to consult with the vendors from which the prices were collected.

Prices were also collected for the cheapest brand of carbonated SSBs in each country to allow for a price dispersion analysis. In addition, in order to enable price comparisons within and between SSBs and non-SSBs, prices of two other SSBs were collected for the most sold brands of isotonic drinks and 100% fruit juices, as well as prices for the most sold brand of milk as one additional non-SSB.

Table 2 below provides a definition for each of the beverages for which information was collected. These definitions were provided to the survey respondents. Bottled water (water without added sugars or

⁵ No data available for the Caribbean.

⁶ Data were collected on Coca-Cola.

⁷ No data available for the Caribbean.

artificial sweeteners) and milk (milk without added sugars or artificial sweeteners) are not defined due to the common knowledge regarding these beverages.

Table 2. Definition of selected beverages

Beverage	Description
Carbonated SSBs	Carbonated SSBs are beverages that contain carbonated water, free sugars added by the manufacturer, and natural or artificial flavoring. A carbonated SSB may also contain caffeine, colorings, preservatives, and/or other ingredients; e.g., sodas.
Fruit drinks	Fruit drinks are processed sugar-sweetened juices/nectars (<100% concentration). They are beverages that contain water, unpasteurized or pasteurized juice, free sugars (both naturally present in fruit juices and fruit juice concentrates and added by the manufacturer), and may also contain artificial or natural flavorings, preservatives and/or additives; e.g., processed orange juice with added sugar.
Fruit juices	Fruit juices are beverages that contain naturally present free sugars, but do not contain any added sugars or sweetening material; e.g., 100% pure orange juice with no added sugar or sweetening ingredients.
Sugar-sweetened milk drinks	Sugar-sweetened milk drinks are beverages that contain dairy milk and added sugars. They are usually flavored and may also contain thickeners; e.g., strawberry-flavored milk drink sold in a container.
Isotonic drinks	Isotonic drinks are beverages that contain water, minerals, and added sugars; e.g., sports drinks.
Energy drinks	Energy drinks are beverages that contain large amounts of caffeine, added sugars, other additives, and legal stimulants such as guarana, taurine, and L-carnitine.

Regarding beverage volume sizes, for the most sold and the cheapest brand of carbonated SSBs, two different sizes were selected: 355 milliliters (ml) and one litre as they appear to be the most common presentations found in Latin America⁸ (12). Due to a lack of market data, for bottled water, isotonic drinks, and energy drinks, the size was not specified, only that the bottle selected must be for individual consumption, and survey respondents were asked to specify the volume size selected. For all other beverages, since amount-specific excise taxes in many countries are established with one litre as a base, for standardization purposes, one litre of each was selected. Section 3.2 describes how pricing information for these beverages was collected.

⁸ No data available for the Caribbean.

3. Data collection and analysis

The two main informational inputs for estimating the tax share indicator are: 1) tax rates, bases, and structures, and 2) beverage nominal final retail prices and product information. This section describes the respective processes to collect and analyze tax legislation, nominal final retail prices, and product information for calculating the tax share indicator and validate the estimates.

3.1 Survey process and validation

The PAHO SSB tax survey was conducted online between March and December 2019 as part of PAHO NCD Country Capacity Survey 2019, and was completed by officially-nominated Ministry of Finance practitioners from 27 PAHO Latin American and Caribbean Member States (all except the Argentine Republic, the Commonwealth of the Bahamas, the Plurinational State of Bolivia, the Republic of Costa Rica, the Republic of Haiti, and the Republic of Nicaragua).

Survey respondents were asked to provide information on tax structures, bases, rates, and supporting legislation⁹, as well as nominal price data, and product information (volume size, sugar content, and country of origin). The cut-off date for the tax information was March 31, 2019.

After analysis, final estimates and indicators were sent to the respective governments for review and sign-off. To facilitate review by governments, a summary sheet was generated for each country and was sent for review prior to publication. In cases where national authorities requested data changes, the requests were assessed according to both the legislation and the clarification shared by national authorities, and data were updated or left unchanged. In cases where national authorities explicitly did not approve publication of the data, this will be specifically noted in the published results.

3.2 Analysis of tax legislation

In addition to the tax legislation collected via the PAHO SSB tax survey, we reviewed legislation already collected through the following PAHO/WHO monitoring tools: the WHO Global Nutrition Policy Review, the WHO Report on the Global Tobacco Epidemic, the WHO Global Information System on Alcohol and Health, and the PAHO NCD Country Capacity Survey. We also conducted searches on websites of parliaments and ministries of finance, and legal databases. All information about taxes is based on legislation in effect up to March 31, 2019.

The legislation was analyzed to cross validate the information provided by survey respondents and to describe all taxes levied on non-alcoholic beverages, including VAT, amount-specific excise taxes, ad valorem excise taxes, import duties, and other indirect taxes, according to the definitions in **Table 1**.

⁹ In this report, we refer to legislation as any tool used by national governments to impose obligations to their citizens and corporations, such as laws, decrees, regulations, norms, guidelines, and other tools for administrative regulations, among others, that national authorities impose as mandatory.

This information was then systematized into a table format, such as in **Box 1**.

Box 1. Summary of systematized information collected on taxes for each country

1. Value added taxes or sales taxes (VAT)
 - a. VAT rate
 - b. VAT base
2. Ad valorem excise taxes
 - a. Ad valorem rate
 - b. Ad valorem base
 - c. Ad valorem base value, if available
3. Amount-specific excise taxes
 - a. Amount-specific rate
 - b. Amount-specific base
4. Import duties
 - a. Imported beverage or not?
 - b. If yes, country of origin
 - c. If yes, import duty rate
 - d. If yes, import duty base
 - e. If yes, import duty base value, if available
5. Other taxes
 - a. Other taxes name
 - b. Other taxes rate
 - c. Other taxes base

3.3 Collection of nominal final retail prices

The first step was to define the beverage types for which nominal final retail prices would be collected. Section 2.2 describes the rationale behind the selection. Box 2 lists these beverages along with the volume requested to survey respondents.

Box 2. Summary of non-alcoholic beverages for which nominal final retail prices were requested

- One 355 ml can/bottle of carbonated SSB, internationally comparable brand¹⁰
- One 1 L bottle of carbonated SSB, internationally comparable brand¹¹
- One 355 ml can/bottle carbonated SSB, cheapest brand
- One 1 L bottle of carbonated SSB, cheapest brand
- One 1 L bottle of fruit drink (<100% concentration), most sold brand
- One 1 L bottle of fruit juice (100% concentration), most sold brand
- One 1 L bottle of sugar-sweetened milk drink, most sold brand
- One 1 L bottle of milk, most sold brand

¹⁰ Data were collected on Coca-Cola.

¹¹ Data were collected on Coca-Cola.

- One bottle of isotonic drink for individual consumption (volume to be specified by survey respondents, standardized to 500 ml), most sold brand
- One bottle of energy drink for individual consumption (volume to be specified by survey respondents, standardized to 250 ml), most sold brand
- One bottle of water for individual consumption (volume to be specified by survey respondents, standardized to 500 ml), most sold brand

The volume sizes requested for collection of prices might not be available in all countries. In those cases, the final retail price of the closest volume size was collected, and the price adjusted to a standardized volume for each beverage type. These standardized volumes are the same as the volumes requested for price collection for all beverages, except for isotonic drinks, energy drinks, and bottled water. For these beverages the standardized volumes are displayed in parenthesis in **Box 2** and are the following: bottled water (500 ml), energy drink (250 ml), and isotonic drink (500 ml). For these three beverages, the standardized volumes were chosen by analyzing the mode of the distribution of the different volumes reported by survey respondents, to reduce the number of beverages for which volume needed to be standardized.

Volumes were standardized assuming a linear transformation of the price. The standardization of volumes might alter the calculation of the tax share or other indicators by over or underestimating final retail prices. Indeed, usually, as the volume of a beverage presentation increases, the price per milliliter tends to decrease. However, volume standardization allows for cross country comparisons of these indicators that would not be possible otherwise.

All final retail prices were collected first from a nationally representative supermarket or hypermarket, defined as a retail outlet (chain or independent store) with a selling space of over 2,500 square meters and with a primary focus on selling food/beverages, and secondly from the most popular other store type, which may include convenience stores, small independent food stores, gas stations, etc. Survey respondents were asked to select the most popular other store type based on national market share information. Final retail prices from supermarkets or hypermarkets were used to calculate the tax share and other indicators. The collection of final retail prices from the most popular other store resulted in a lot of missing data. Final retail prices from this store type were only used to validate the data.

In order to determine the popularity of the brands for the different types of beverages, survey respondents were asked to base their decision on national market share information. If this information was not available, survey respondents were asked to consult with the vendors from which the final retail prices were collected.

The instructions to survey respondents for collecting final retail prices are detailed in **Box 3**.

Box 3. Instructions for collecting nominal final retail prices in supermarkets/hypermarkets and in the most popular other store type

- Survey respondents are asked to provide nominal final retail prices:
 - obtained from a nationally representative supermarket/hypermarket and the most popular other store type
 - **inclusive of all taxes and in local currency**
 - indicate if the beverage is **locally produced or imported**, and indicate for the latter, the country of origin
 - indicate the volume size and sugar content of the beverage
- If a beverage is not available in the required volume size, survey respondents are asked to provide information on the volume size with the closest volume above the requested volume, specifying the size of the beverage.
- If national market share information is not available, survey respondents are asked to consult with the vendors from which the final retail prices were collected in order to determine popularity of the brands.
- If the cheapest brand for carbonated SSBs cannot be identified using national market share information, survey respondents are asked to consult with the vendors from which the prices were collected in order to determine the cheapest brand.
- The brand selected for the 355 ml can/bottle of the cheapest carbonated SSB can be different than the one selected for the 1 L bottle of the cheapest carbonated SSB. However, both cannot be more expensive than the internationally comparable brand requested for the same volume size. If the internationally comparable brand requested is indeed the cheapest brand for one or both requested volume sizes, survey respondents are asked to leave the information blank for cheapest carbonated SSB and mention it in the comments section.

For comparability between countries, all prices are converted in international dollars at purchasing power parity (PPP) using the International Monetary Fund (IMF)'s implied PPP conversion rates for 2019 (13). For countries for which excise taxes, import duties, or other indirect taxes amount-specific rates are defined in United States dollars rather than the local currency, the IMF's International Financial Statistics database exchange rates for March 2019 are used (14).

4. Estimation of the proportion of indirect taxes in the final retail price

As mentioned above, the tax share indicator estimates the percentage of the final retail price that corresponds to indirect taxes, such that:

$$Total\ tax\ share = S_{VAT} + S_{as} + S_{av} + S_{id} + S_o \quad (2)$$

S_{VAT} represents the share of value added taxes (VAT) or sales taxes in the final retail price.

S_{as} represents the share of amount-specific excise taxes in the final retail price.

S_{av} represents the share of ad valorem excise taxes in the final retail price.

S_{id} represents the share of import duties in the final retail price.

S_o represents the share of other taxes in the final retail price.

Equation 2 is simply turning Equation 1 into a sum of fractions, each of them representing the share of one type of taxes in the final retail price. Consequently, the first step is to calculate the share of each type of taxes in the final retail price, as follows.

4.1 Calculating the share of VAT or sales taxes in the final retail price

The first calculation that is made is the share of VAT or sales taxes in the final retail price because either of these taxes are usually applied in the last stage of sale (and consequently the final retail price, the denominator here, can include other indirect taxes). In most countries, VAT or sales taxes are calculated applying their statutory tax rate ($VAT\%$) to the final retail price excluding the *VAT amount*, therefore:

$$S_{VAT} = \frac{VAT\ amount}{Final\ retail\ price} \quad (3)$$

$$VAT\ amount = (Final\ retail\ price - VAT\ amount) * VAT\% \quad (4)$$

Solving Equation 4 for *VAT amount* leads to:

$$VAT\ amount = \frac{Final\ retail\ price * VAT\%}{1 + VAT\%} \quad (5)$$

Replacing Equation 5 in Equation 3 leads to the following formula for the share of VAT or sales taxes in the final retail price:

$$S_{VAT} = \frac{VAT\%}{1 + VAT\%} \quad (6)$$

In some countries, however, survey respondents indicated that the VAT or sales was not effectively collected at all levels of the supply chain. For example, in the Federal Republic of Brazil, the VAT or sales tax rate is applied on government fixed average prices. Another example, in the Republic of Suriname, for imported beverages, the VAT or sales tax rate is applied on the CIF value including excise taxes and import and custom duties.

4.2 Calculating the share of amount-specific excise taxes in the final retail price

The next step is to calculate the amount-specific excise tax share. As described in Table 1, amount-specific excise taxes consist of a fixed amount based on volume or sugar content.

Where amount-specific excise taxes are calculated by sugar content, the following data and information are used: the reported total sugar content of the beverage (e.g., 10 g of sugar), the volume of the beverage, the amount-specific excise tax per gram of sugar per taxable unit volume (e.g., \$1 per 10 g of sugar/100 ml), and the taxable unit volume (e.g., 100 ml) in order to calculate the amount-specific excise tax T_{as} . As of March 2019, only the Republic of Ecuador in Latin America and the Caribbean imposed amount-specific excise taxes based on sugar content. In this case:

$$T_{as} = \frac{\text{Sugar content} \times \text{Volume beverage} \times \text{Tax per gram sugar per tax unit volume}}{\text{Taxable unit volume}} \quad (7)$$

In all other cases, amount-specific excise taxes are calculated by volume. The volume of the beverage, the amount-specific excise tax per taxable unit volume (e.g., \$1 per liter), and the taxable unit volume (e.g., 1 L) are used in order to calculate the amount-specific excise tax T_{as} . In these cases:

$$T_{as} = \frac{\text{Volume beverage} \times \text{Tax per taxable unit volume}}{\text{Taxable unit volume}} \quad (8)$$

In both cases, the share of amount-specific excise taxes in the final retail price is easy to recover:

$$S_{as} = \frac{T_{as}}{\text{Final retail price}} \quad (9)$$

4.3 Calculating the share of ad valorem excise taxes in the final retail price

For ad valorem excise taxes, the rate $T_{av}\%$ is applied on the tax base provided by survey respondents and cross-validated with provided legislation. Ad valorem excise taxes typically apply on a tax base M , such that the share of ad valorem excise taxes in the final retail price is given by the following equation:

$$S_{av} = \frac{T_{av}\% * M}{\text{Final retail price}} \quad (10)$$

Calculating the share of ad valorem excise taxes is fairly straightforward when, by law, the base M is fixed later in the value chain, such as the final retail price, the final retail price excluding VAT, or the final retail price excluding VAT and excise. The share of ad valorem excise taxes is also easy to recover when the tax is applied on fixed tax base amounts M , as it is the case in the Eastern Republic of Uruguay, where they are set by decree and vary per beverage type.

In other cases, when the tax base is fixed earlier in the value chain, such as the producer's price, the calculation of this share of the final retail price is not as straightforward and differs for locally produced beverages (section 4.3.1.) and imported beverages (section 4.3.2.).

4.3.1 Locally produced beverages

In the case of locally produced beverages, in Latin America and the Caribbean, when the tax base is not the final retail price, the final retail price excluding VAT, the final retail price excluding VAT and excise, or fixed tax base amounts, this base is the producer's price. This is the case for Barbados, the Federal Republic of Brazil, the Commonwealth of Dominica, the United Mexican States¹², and the Republic of Paraguay. For these countries, ad valorem excise taxes are applied on a base that does not include amount-specific excises taxes, ad valorem excise taxes, VAT, or the retailer's and wholesaler's profits π . When this base value M is not provided by survey respondents, it has to be estimated using the following methodology:

$$M = \text{Final retail price} - \text{VAT amount} - T_{as} - T_{av}\% * M - \pi \quad (11)$$

Using Equation 5 that defines the *VAT amount* and solving for M lead to:

$$M = \frac{\frac{\text{Final retail price}}{1 + \text{VAT}\%} - T_{as} - \pi}{(1 + T_{av}\%)} \quad (12)$$

Therefore, only one unknown variable remains, the retailer's and wholesaler's profits π . This information is rarely publicly disclosed and will vary from country to country. While it could be assumed that supermarkets' retail margins are small, assuming distribution margins (retailers' and wholesaler's margins) to be zero would overestimate the base for ad valorem excise taxes M and in turn the amount of ad valorem excise taxes and the total share of taxes in the final retail price. On the other hand, there is a risk of underestimating the base M by assuming high distribution margins in countries where the distribution of SSBs is a very competitive market.

Consequently, distribution margins of 20% are assumed. Applying this assumption to all countries using the producer's price as tax base allows for comparisons of excise tax share estimates among them. In addition, it allows for fairer comparisons with countries using tax bases fixed later in the value chain (closer to the retail price), such as the retail price excluding VAT and excise, by estimating a lower relative base M for countries using the producer's price.

¹² In the United Mexican States, the ad valorem component applies only to energy drinks.

4.3.2 Imported beverages

In the case of imported beverages, when the tax base is not the final retail price, ad valorem excise taxes typically apply on a base M' , such that the share of ad valorem excise taxes in the final retail price is given by the following equation, equivalent to Equation 10:

$$S_{av} = \frac{T_{av}\% * M'}{Final\ retail\ price} \quad (13)$$

In most cases, this base M' consists of the CIF value and import duties.¹³ However, import duties typically apply on the CIF value, therefore import duties are expressed as a function of the CIF value and the import duty rate provided by survey respondents and cross-validated with provided legislation. Therefore, M' is expressed as follows:

$$M' = CIF + ID = CIF * (1 + T_{id}\%) \quad (14)$$

Where CIF represents the CIF value, ID the import duties, and $T_{id}\%$ the import duty rate.

When the value of base M' is not provided by survey respondents, it has to be estimated. In order to estimate M' , the only unknown variable that needs to be estimated is the CIF value. The CIF value is the base for import duties. It does not include import duties, the retailer's and wholesaler's profits π , amount-specific excises taxes, ad valorem excise taxes, VAT, or the importer's profit π' . If the CIF value is not provided by survey respondents, it can theoretically be estimated using the following equation:

$$CIF = Final\ retail\ price - VAT\ amount - T_{as} - T_{av}\% * M' - \pi - ID - \pi' \quad (15)$$

Using Equation 5 that defines the $VAT\ amount$, Equation 14 that defines M' , and solving for CIF lead to:

$$CIF = \frac{\frac{Final\ retail\ price}{1 + VAT\%} - T_{as} - \pi - \pi'}{(1 + T_{av}\%) * (1 + T_{id}\%)} \quad (16)$$

As in the case of locally produced beverages, distribution margins are assumed to be 20%.

The CIF value cannot be estimated as Equation 16 cannot be solved. Indeed, the importer's profit π' is unknown. It is rarely publicly disclosed and will vary from country to country. In practice, however, the importer's profit can be relatively significant and setting it to zero would substantially overestimate the CIF value, thus M' , and thereby substantially overestimate the share of ad valorem excise taxes in the final retail price. For this reason, the CIF value has to be estimated differently.

¹³ In some countries, such as the Commonwealth of Dominica, Saint Kitts and Nevis, and Saint Vincent and the Grenadines, the base M' also includes other indirect taxes, such as the Custom Service Charge (CSC). In this case, the amount of other taxes is added to Equation 14. This does not change the methodology presented in section 4.3.2. Indeed, other taxes are calculated independently from excise taxes, following the methodology described in section 4.5.

As WHO does for the estimation of the tobacco tax share indicator (8), the United Nations Comtrade database is used as a secondary source to obtain the CIF value when this value is not provided by survey respondents (15). This global trade database provides import and export statistics by country and tariff code. A tariff code or HS code is an internationally standardized nomenclature using four to six figures to classify traded products (16). The UN Comtrade database provides yearly total value and volume traded by HS code by country and trading partner. For the five beverage types for which the tax share indicator is estimated, import data is extracted for the latest year available for the following HS codes:

- Carbonated SSB (small and large size): 220210
- Fruit drink: 2009
- Sugar-sweetened milk drink: 040299¹⁴
- Energy drink: 220290
- Bottled water: 220110

When import data are not available for a given country and trading partner, world average import data for this given country are used.

A linear transformation of the total value traded is assumed, using the selected standardized volume size of each beverage, to obtain their CIF value. The total volume traded for fruit drinks and sugar-sweetened milk drinks is usually provided in kilograms, therefore, this volume traded is multiplied by the following densities from the UN Food and Agriculture Organization (FAO) to obtain the total volume traded in liters (17):

- Fruit drink: 1.05 kg/L
- Sugar-sweetened milk drink: 1.04 kg/L

Using the UN Comtrade database has limitations. The most important for this analysis is that the brand of interest might not be the only one traded between two given countries under a given HS code for a given year; therefore the total value and volume traded could contain trade information for other brands. However, as the brand collected for each beverage type for which the tax share indicator is calculated is the most sold brand¹⁵, the CIF value obtained through the UN Comtrade database should be representative for the most sold brand.

4.4 Calculating the share of import duties in the final retail price

An import duty is a tax on a selected commodity imported in a country and destined for domestic consumption (i.e., the goods are not in transit to another country). In general, import duties are collected from the importer at the point of entry into the country. Import duties can be either ad valorem or

¹⁴In the case of the Commonwealth of Dominica, the broader HS code 0402 is used for sugar-sweetened milk drink instead of HS code 040299, as data for this latter is not available at the time of the analysis.

¹⁵The internationally comparable brand of carbonated SSB collected (Coca-Cola) is also the most sold brand in most countries.

amount-specific. In cases of preferential trade agreements with the country origin, if import duties information is not provided by survey respondents, the lowest possible import duties is assumed.

4.4.1 Amount-specific import duties

When amount-specific import duties are applied, they are generally calculated by volume. Therefore, the volume of the beverage, the amount of import duties per taxable unit volume (e.g., \$10 per 100 L), and the taxable unit volume (e.g., 100 L) are used in order to calculate the amount-specific import duties T_{id} . In this case:

$$T_{id} = \frac{\text{Volume of beverage} \times \text{Import duties per taxable unit volume}}{\text{Taxable unit volume}} \quad (17)$$

Therefore, the share of import duties in the final retail price is easy to recover:

$$S_{id} = \frac{T_{id}}{\text{Final retail price}} \quad (18)$$

4.4.2 Ad valorem import duties

When ad valorem import duties are applied, the import duty rate $T_{id}\%$ is usually applied on the CIF value, which is rarely readily available. The share of ad valorem import duties in the final retail price is given by the following equation:

$$S_{id} = \frac{T_{id}\% * CIF}{\text{Final retail price}} \quad (19)$$

If the CIF value is not provided by survey respondents, secondary data is used, as explained in section 4.3.2.

4.5 Calculating the share of other taxes in the final retail price

Other indirect taxes are applied either to a quantity (volume of the beverage or the quantity of a certain type of container, therefore amount-specific) or to the value of a beverage (therefore ad valorem). Examples of other taxes are environment levy, revenue recovery charge, or custom service charge.

Environment levies are counted in the estimation of the share of other taxes, even when in some countries they work as a deposit that is refunded when the container is returned. Indeed, since such levies can have an impact on the final retail price that consumers face, it is important to account for them. When

environment levies are based on container type, and this information is not provided by survey respondents, it is assumed that containers for carbonated SSBs, energy drinks, and bottled water are plastic bottles or cans and that containers are made of cardboard for fruit drinks and sugar-sweetened milk drinks.

4.5.1 Amount-specific other taxes

When amount-specific other taxes are applied, they are generally calculated by volume or the quantity of a certain type of container. For amount-specific other taxes calculated by volume, the volume of the beverage, the amount of other taxes per taxable unit volume (e.g., \$1 per 100 L), and the taxable unit volume (e.g., 100 L) are used in order to calculate the amount-specific other taxes T_o . In this case:

$$T_o = \frac{\text{Volume of beverage} \times \text{Tax per taxable unit volume}}{\text{Taxable unit volume}} \quad (20)$$

As the tax share indicator is calculated for a single unit of selected beverages, for amount-specific other taxes calculated by the quantity of a certain type of container, the amount-specific other taxes T_o is equal to the tax amount per taxable unit (e.g., \$0.05 per bottle or can).

$$T_o = \text{Tax amount per taxable unit} \quad (21)$$

Therefore, in both cases, the share of other taxes in the final retail price is easy to recover:

$$S_o = \frac{T_o}{\text{Final retail price}} \quad (22)$$

4.5.2 Ad valorem other taxes

In the case of ad valorem other taxes, the other taxes rate $T_o\%$ is applied to a tax base M'' , which is generally equal to the final retail price or the final retail price excluding some or all taxes for locally produced beverages, and in most cases to the CIF value for imported beverages. The share of ad valorem other taxes in the final retail price is given by the following equation:

$$S_o = \frac{T_o\% * M''}{\text{Final retail price}} \quad (23)$$

If the CIF value is not provided by survey respondents, secondary data is used, as explained in section 4.3.2.

Several other taxes can apply to one beverage. In this case, the share of other taxes is the sum of the share of each other taxes.

5. Additional price and tax policy indicators

Additional indicators can be defined for prices and taxes, but also for tax policies in order to capture the full scope of the tax environment surrounding SSBs. Their definition is also based on the methodology used by WHO to monitor prices and taxes applied on tobacco products since 2008 (8).

5.1 Excise tax share

This indicator is the total share of excise taxes – ad valorem and amount-specific – in the final retail price. It is calculated as follows:

$$\text{Excise tax share} = S_{av} + S_{as} \quad (24)$$

The higher the excise tax share, the greater the reliance on excise taxes.

5.2 Affordability indicator

In the case of tobacco, WHO defines the affordability indicator as the proportion of GDP per capita required to buy 100 packs of 20 cigarettes of the most sold brand (8). If this same definition were to be applied to 100 bottles for each of the selected beverages, this would allow comparisons of affordability between countries as the volume of each beverage selected is standardized, but it would not be possible to use the indicator to compare affordability between beverage types inside a given country, as the standardized volume differs between beverage types.

Therefore, following previous work in the literature (18), the affordability indicator is defined per 100 L of a given beverage. The indicator is calculated using the following formula:

$$\text{Affordability indicator} = \frac{\text{Final retail price} * \frac{1000}{V} * 100}{\text{GDP per capita}} \quad (25)$$

Where V represents the standardized volume of the selected beverage in milliliters (see **Box 2**).

The final retail price and the GDP per capita are in local currency unit. GDP per capita data at current prices are derived from the IMF's World Economic Outlook (WEO) database (13).

The affordability of a beverage is inversely proportionate to the affordability indicator defined above. This indicates that if GDP per capita increases, while the final retail price of a beverage remains constant or decreases, or if the final retail price decreases, while GDP per capita remains constant or increases, the above indicator decreases and affordability increases.

Although this affordability indicator allows for cross-country and cross-beverage types comparisons of affordability, it contains one strong limitation, which relates to the assumption of linear transformation

of prices. Indeed, the selected standardized volumes are all below or equal to 1 L and multiplying the final retail price for the selected standardized volume to obtain the price of 100 L of a given beverage is overestimating this latter. Indeed, prices for smaller volume containers tend to be higher per milliliter than prices for larger volume containers. Since the goal of this exercise is to measure how high is the share of GDP per capita required to buy 100 L of a given beverage, this assumption does not penalize countries as it overestimates the affordability indicator. In addition, an overestimation of the affordability indicator is acceptable given the comparable treatment across countries.

The affordability indicator will be most valuable if the collection of data is repeated regularly and changes over time are analyzed, as done by WHO for cigarettes affordability trends since 2017 (8).

5.3 Price dispersion indicator

The price dispersion indicator is defined as the share of the final retail price of the cheapest brand of carbonated SSB in the final retail price of the internationally comparable brand requested, for the same volume. It is calculated using the following formula:

$$\text{Price dispersion} = \frac{\text{Final retail price cheapest carbonated SSB}}{\text{Final retail price internationally comparable brand carb SSB}} \quad (26)$$

The indicator is calculated for small (355 ml) and large carbonated SSBs (1 L).

The smaller the gap between the prices, the higher the value of the indicator.

5.4 Tax policy indicators

Several other tax policy indicators are defined in order to better understand the tax administration and tax design applied on SSBs in Latin America and the Caribbean. Their definition is also based on the methodology used by WHO to monitor tobacco taxes (8).

Type of excise taxes applied

This indicator simply states if excise taxes are amount-specific, ad valorem, a mix of the two¹⁶, a combination of the two¹⁷, or if no excise taxes are applied. As of March 2019, one country, the Eastern Republic of Uruguay, has a particular excise tax structure as it imposes an ad valorem excise tax on fixed tax base amounts defined per beverage type and set by decree. Though it may have the structure of an

¹⁶ A mixed excise tax structure means that at least one beverage type is taxed by both an ad valorem excise tax and an amount-specific excise tax. As of March 2019, only the United Mexican States and the Republic of El Salvador apply a mixed excise tax structure, and only on energy drinks.

¹⁷ A combined excise tax structure means that at least one beverage type is taxed by an ad valorem excise tax and at least one other type is taxed by an amount-specific excise tax but no beverage type is taxed by both.

ad valorem excise tax, this type of structure is effectively an amount-specific excise tax, and was categorized as such in this analysis.

Uniform versus tiered excise tax system

In countries applying excise taxes on SSBs, this indicator informs whether a uniform excise tax system is in place, consisting of a unique excise tax rate or amount for all taxed beverages, or a tiered excise tax system, where variable rates or amounts apply based on selected criteria of beverages (by beverage type, volume or sugar content).

Excise tax based on sugar content

In countries applying excise taxes on SSBs, this indicator informs whether excise taxes are applied based on sugar content. Some countries can apply excise taxes on beverages over a particular sugar concentration threshold (e.g., 5 g of sugar 100 ml) or apply different rates or amounts to beverages based on their sugar content. This is recommended in countries with strong tax administration.

Excise tax applies to powders, concentrates or syrups

In countries applying excise taxes on SSBs, this indicator captures whether excise taxes apply on at least one of the following products: powders, concentrates, and syrups.^{18,19,20} These products are used to produce SSBs by mixing them with water or carbonated water. All forms of free sugars are considered a risk factor as indicated in the WHO Guideline: Sugars Intake for Adults and Children (2), therefore it is recommended to include such products in the list of taxed products.

Retail price (or retail price exclusive of VAT or retail price exclusive of VAT and excise) used as base for ad valorem excise taxes on locally produced beverages

In countries applying ad valorem, mixed, or combined excise tax systems, ad valorem excise taxes applied to the retail price, the retail price excluding VAT, or the retail price excluding VAT and excise are applied on a larger tax base than the producer's price. The retail price is easier to determine than the producer's price, and therefore there is less risk of undervaluation of the tax base. This indicator informs whether or not ad valorem excise taxes are applied on the retail price (or the retail price excluding VAT or the retail price excluding VAT and excise). It is not applicable to countries where only amount-specific excise taxes are applied or where no excise tax is applied.

Automatic adjustment for inflation (or another economic indicator) of amount-specific excise tax on a periodic basis

In countries applying amount-specific, mixed, or combined excise tax systems, if the amount-specific component is not adjusted for inflation (or another economic indicator such as average income), its real

¹⁸ Powders (e.g., Tang, Turbo), HS codes: 2106, 1806.

¹⁹ Concentrates, HS code: 2101.

²⁰ Syrups, HS code: 2106.

value will diminish over time. This indicator captures whether or not the legislation mandates that amount-specific excise taxes be periodically automatically adjusted. This indicator is not applicable to countries where only ad valorem excise taxes are applied or where no excise tax is applied.

Minimum amount-specific excise tax

In countries applying ad valorem, mixed or combined excise tax systems, this indicator informs whether there is a minimum amount-specific excise tax applied. A minimum amount-specific excise tax provides protection against unhealthy products being underpriced. Indeed, it forces prices up since the price will not be lower than the excise tax paid. This indicator is not applicable to countries where only amount-specific excise taxes are applied or where no excise tax is applied.

Minimum price policy

A minimum price policy is a policy which mandates the lowest price at which specific beverages can be sold. This indicator captures whether there is a minimum price policy applied.

5.5 Excise tax revenue and earmarking

Excise tax revenue

In countries applying excise taxes on SSBs, this indicator reports the annual amount of excise tax revenue from SSBs, as reported by survey respondents for the latest fiscal year available. Amounts are reported in local currency units.

Earmarking of excise tax revenue

In countries applying excise taxes, this indicator informs whether excise tax revenues (a portion or all) is dedicated to any specific health purpose (e.g., health programmes, installation of safe piped water for public use such as water fountains in schools). Excise taxes can generate substantial revenues. Revenues can be used to fund health care, which is often underfunded and put under strain as a result of NCDs.

6. Methodological limitations and other considerations

The methodology to calculate the tax share and other price indicators has limitations, largely due to the data availability constraints and the necessity to have standardized and comparable indicators across countries and beverage types.

National representativeness of prices. In countries where national market share data are not available, survey respondents are instructed to consult vendors to select the most sold brand. This could potentially lead to the selection of most sold brands that may not be nationally representative. In addition, the final retail price data used were collected from one supermarket/hypermarket usually in the capital city of the country where survey respondents are mostly based. Thus, prices collected may not be nationally representative. Finally, prices from the most popular other type of store (independent food store, etc.) and on-trade channels (restaurants, bars, etc.) are not taken into account in the estimations. In some countries, such store types may represent a significant market share.

Standardization of volumes. The volume sizes requested for collection of prices might not be available in all countries. In those cases, the final retail price of the closest volume size was collected and then adjusted to a selected standardized volume assuming a linear transformation of the price. The mode of the distribution of the volume sizes collected was found to be equal to the standardized volume for each beverage type. However, as the container size of a beverage increases, its price per milliliter tends to decrease. Therefore, the tax share and other price indicators estimations may be altered.

CIF value. As explained in section 4.3.2, when the CIF value is not provided by survey respondents, it is estimated using secondary data. The brand of interest may not be the only one traded between two given countries under a given HS code for a given year. Therefore, the total value and volume traded could contain trade information for other brands. However, as the brand selected for each beverage type for which the tax share indicator is calculated is the most sold brand²¹, the CIF value obtained through this method should be representative of the selected brand.

In addition, in the case of fruit drinks, the HS code used (2009) does not differentiate between fruit juices or fruit drinks: “Fruit juices (including grape must) and vegetable juices, unfermented and not containing added spirit, whether or not containing added sugar or other sweetening matter”. It was not possible to use a more disaggregated HS code as the survey did not ask respondents for the type of fruit used in the preparation of the fruit drink for which prices were collected. Finally, in the case of sugar-sweetened milk drinks, the HS code 040299 is defined as “Dairy produce; milk and cream, containing added sugar or other sweetening matter, other than in powder, granules or other solid forms”; it does not differentiate between sugar-sweetened milk drinks (e.g., strawberry or chocolate sugar-sweetened milk drinks) and sugar-sweetened condensed milk.

²¹ The internationally comparable brand of carbonated SSB collected (Coca-Cola) is also the most sold brand in most countries.

Distribution margins mark-up assumption. Making an arbitrary non-zero assumption for the total distribution margins for countries using the producer's price as base for ad valorem excise taxes may lead to over- or under-estimations of tax share estimates. However, based on our analysis, total tax share estimates are only slightly sensitive to different levels of distribution margins mark-up assumption, and applying the same assumption to all countries using the producer's price as tax base allows for comparisons of excise tax share estimates among them. It also allows for fairer comparisons with countries using tax bases fixed later in the value chain (closer to the retail price), by estimating a lower relative tax base for countries using the producer's price.

Use of GDP per capita to measure affordability. Using GDP per capita tends to underestimate affordability, as per capita income grows faster than per capita GDP in most countries (19). However, it should be mentioned that per capita GDP is equally underestimated for all countries. Therefore, the variations in the affordability indicator between countries are assumed not to be altered by such a discrepancy.

7. References

1. World Health Organization (2013). Global Action Plan for the Prevention and Control of NCDs 2013-2020. Geneva: WHO. Available from: <https://www.who.int/publications/i/item/9789241506236>
2. World Health Organization (2015). Guideline: Sugars intake for adults and children. Geneva: WHO. Available from: <https://apps.who.int/iris/handle/10665/149782>
3. Pan American Health Organization (2020). Sugar-sweetened beverage taxation in the Region of the Americas. Washington D.C.: PAHO. Available from: <https://iris.paho.org/handle/10665.2/53252>
4. World Health Organization (2017). Technical Annex: Updated Appendix 3 of the WHO Global NCD Action Plan 2013–2020. Geneva: WHO. Available from: https://www.who.int/ncds/governance/technical_annex.pdf
5. World Health Organization (2017). Tackling NCDs: ‘Best buys’ and other recommended interventions for the prevention and control of noncommunicable diseases. Geneva: WHO. Available from: <https://apps.who.int/iris/handle/10665/259232>
6. World Health Organization (2021). WHO report on the global tobacco epidemic 2021: addressing new and emerging products. Geneva: WHO. Available from: <https://www.who.int/publications/i/item/9789240032095>
7. Pan American Health Organization (2019). Meeting to Develop a Standardized Tax Share Indicator for Alcoholic and Sugar-Sweetened Beverages (Washington, D.C., 24-25 July 2018). Washington D.C.: PAHO. Available from: <https://iris.paho.org/handle/10665.2/51715>
8. World Health Organization (2019). Report on the Global Tobacco Epidemic, 2019: Offer help to quit tobacco use. Technical Note III: Tobacco taxes in WHO Member States. Geneva: WHO. Available from: <https://www.who.int/teams/health-promotion/tobacco-control/who-report-on-the-global-tobacco-epidemic-2019>
9. GlobalData (2018). Consumer goods database. Market Data. London: GlobalData. Available from: <https://www.globaldata.com>
10. Pomeranz, J. L., Munsell, C. R., & Harris, J. L. (2013). Energy drinks: an emerging public health hazard for youth. *Journal of public health policy*, 34(2), 254-271.

11. Patel, A. I., Moghadam, S. D., Freedman, M., Hazari, A., Fang, M. L., & Allen, I. E. (2018). The association of flavored milk consumption with milk and energy intake, and obesity: A systematic review. *Preventive medicine*, 111, 151-162.
12. Euromonitor International (2017). Passport database. Available from: <https://go.euromonitor.com/passport.html>
13. International Monetary Fund (2020). World Economic Outlook. Washington D.C.: IMF. Available from: <https://www.imf.org/en/publications/weo>
14. International Monetary Fund (2020). International Financial Statistics. Washington D.C.: IMF. Available from: <https://data.imf.org/?sk=4C514D48-B6BA-49ED-8AB9-52B0C1A0179B>
15. United Nations (2020). UN Comtrade. New York: UN. Available from: <https://comtrade.un.org>
16. World Customs Organization (2017). HS Nomenclature 2017 edition. Brussels: WCO. Available from: <http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/hs-nomenclature-2017-edition/hs-nomenclature-2017-edition.aspx>
17. Food and Agriculture Organization (2012). INFOODS Databases. Density Database Version 2.0. Rome: FAO. Available from: <http://www.fao.org/3/ap815e/ap815e.pdf>
18. Blecher E, Liber AC, Drope JM, Nguyen B, Stoklosa M. (2017). Global Trends in the Affordability of Sugar-Sweetened Beverages, 1990–2016. *Prev Chronic Dis*;14:160406.
19. Nolan, B., Roser, M., & Thewissen, S. (2019). GDP per capita versus median household income: What gives rise to the divergence over time and how does this vary across OECD countries?. *Review of Income and Wealth*, 65(3), 465-494.

