Health taxes from an EU perspective

Final report

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ABSTRACT

This study contributes to the growing body of evidence on the implementation of taxes on high in fat, salt and sugar (HFSS) products in EU Member States. It provides a foundation for initial discussions with EU Member States on advancing HFSS taxes in general and particularly sugar-sweetened beverages (SSB) taxes within a European framework.

In contrast to several earlier studies carried out at EU level, this study is based on quantitative analyses. The study explores the effects of existing HFSS taxes in EU Member States from 2009 to 2021, and includes in-depth case studies from Belgium, Denmark, France and Poland. Effects covered include cost pass-through, product reformulation, price elasticity, changes in consumption behaviour, product substitution, affordability, cross-border shopping and tax revenue generation.

The study also examines the potential and feasibility of establishing an EU harmonised tax framework for HFSS products and explores whether an EU minimum level of harmonisation for a SSB tax would add value. A simulation of three potential scenarios highlights the change in consumption and the implied reduction in average daily sugar intake. Such a minimum tax would translate into positive health effects, such as a reduction in BMI and in the incidence of related diseases such as ischemic heart diseases and diabetes.

EXECUTIVE SUMMARY

WHY TAX FOOD HIGH IN SUGAR FAT AND SALT (HFSS)?

No less than 100 million European citizens are affected by non-communicable diseases (NCDs) such as cardiovascular diseases, diabetes and cancer.[1] A growing body of evidence links the consumption of foods high in fat, sugar, or salt (HFSS) to obesity and NCDs. HFSS food and drink have little nutritional value and result in a significant proportion of excess sugar, salt and energy intakes, particularly amongst younger age groups. In recent years, an increasing number of Member States have introduced HFSS taxes or reformed existing ones with the stated objective of reducing consumption of HFSS food and drink and thus decreasing associated individual and social costs.

AIMS OF THIS STUDY

This study contributes to the growing body of evidence on the implementation of HFSS taxes in EU Member States, and specifically focuses on which aspects work well in the implementation of such taxes. The study's objective is to **provide a foundation for initial discussions with EU Member States on advancing HFSS taxes** in general and particularly sugar-sweetened beverage (SSB) taxes within a European framework. Thereto, the study:

- explores the effects of existing HFSS taxes in EU Member States from 2009 to 2021. While the study addresses the taxation of HFSS food in general, a specific focus is on SSBs. This reflects the current global taxation practice and the concentration of the existing literature on SSBs;
- examines the potential and feasibility of establishing an EU harmonised tax framework for HFSS products;
- explores whether an EU minimum level of harmonisation for a targeted SSB tax would add value.

In contrast to several earlier studies carried out at EU level, this study is based on quantitative analyses and simulations where possible. It is explorative in nature and combines various methodological approaches. The study includes in-depth case studies from Belgium, Denmark, France and Poland.

HFSS TAXES CAN HAVE POSITIVE HEALTH EFFECTS

To date, **11 EU Member States and Catalonia have introduced some form of HFSS taxation**. Of these, nine countries and the Spanish region of Catalonia tax solely SSBs (Belgium, Croatia, Finland, France, Ireland, Latvia, Netherlands, Poland, Portugal and Catalonia). One country taxes HFSS food products (Denmark: ice cream; chocolate and other confectionery) and one country taxes

[1] According to the Healthier Together – the EU non-communicable disease initiative (FAQs, p.6), 63 million people are living with cardiovascular diseases, 32 million were diagnosed for diabetes (with an additional 24 million non-diagnosed) and 2.7 million cancer patients are expected to be diagnosed.

both SSBs and HFSS food products (Hungary). The momentum for HFSS taxes is growing in the EU, with a number of Member States (e.g. Italy) considering introducing such a scheme. This study includes country fiches providing detailed information on the design of the HFSS tax applied and the background and framing of implementation as well as an overview of their effects.

The effectiveness of HFSS taxes in achieving health and to a lesser extent tax revenue objectives depends on their ability to affect both the supply and demand side of the market. The following elements are of particular importance.

HFSS taxes may encourage product reformulation by producers to reduce the concentration of sugar: the extent of product reformulation varies considerably depending on the brand and the Member State concerned. Moreover, progressive/tiered tax systems are found to be more effective in inducing product reformulation than flat tax rates. Evidence for some Member States suggests that the introduction of HFSS taxes induced producers to reduce the sugar content of their products. However, while a correlation is observed in some Member States, it is more challenging to identify a causal effect, i.e. to isolate the effect of HFSS taxes from broader trends, such as a shift in demand towards less sugary drinks for health reasons or due to a change in tastes. Voluntary sugar reduction programmes seem to have a limited effect.

Tax increases are passed on to consumers: The extent to which HFSS taxation affects prices and consumer behaviour is dependent on cost pass-through. Available evidence points towards high rates of cost pass-through for HFSS taxes, ranging between 70% to over 100%, with variations across countries. This implies that, typically, only a low share of the tax is absorbed by producers, while large parts of these taxes are passed on to consumers, leading to increased prices for taxed products. Sometimes, there is a time lag for the cost pass-through to consumers. The extent of cost pass-through depends on the specific market conditions. For example, a lower pass-through can be expected when there is a higher risk of cross-border shopping or as a consequence of marketing decisions by producers/retailers.

Demand for HFSS products is relatively elastic, although there is some variation across the Member States studied. Overall, estimated price elasticities of demand are between -1 and -1.8 for the Member States studied. The analyses undertaken in this study find somewhat lower price elasticities for some Member States compared to the existing international literature. This may be due to the fact that this study focuses on high-income countries where sensitivity to price increases tends to be somewhat lower, while relatively higher values are typically observed for low-income countries.

A significant increase in retail prices can lead to measurable consumption changes. There is varied evidence on the effectiveness of HFSS taxes in reducing consumption. Measuring the impact of HFSS taxes on consumption behaviour is far from straightforward, as many variables are at play. However, the negative own-price elasticities imply that as long as taxes

are passed through to consumers, as on average is the case in all countries studied, a higher tax rate reduces consumption proportionally.

The analysis undertaken in this study confirms that it is difficult to identify significant changes in consumer behaviour in Member States applying a very low tax rate, which induces a limited increase in the retail prices of taxed products. In the Member States studied, the consumption of SSB-taxed drinks has decreased in comparison to other non-taxed drinks if the tax is sufficiently high to trigger measurable behavioural change. In particular for small tax increases, such effects do not necessarily materialise in the short run but often require a longer time period.

Some shifting from HFSS taxed products to healthier products can be observed, although to various extents. Evidence from some countries studied confirms that consumers seem to be inclined towards product substitution following the introduction of HFSS taxes, with consumption of (non-taxed) low-sugar drinks and mineral waters likely to increase. These changes can take time to emerge and depend on a number of variables. Nevertheless, we have found no evidence that such trends would be reversed over time. Thus, once triggered, tax-induced changes in consumer behaviour tend to be lasting and structural in nature.

HFSS taxes are associated with health benefits. In contrast to the outcomes described above, the evidence on longer-term impacts of HFSS taxation on population health is not as robust and comes mainly from simulation studies. The evidence from these modelling studies indicates that HFSS taxes in general and SSB taxes in particular have the potential to improve population health. An important conclusion that can be drawn from the simulation studies is that HFSS taxes can also significantly reduce health care expenditures. The existing empirical evidence, confirmed by the consultation activities undertaken within this study, suggests that some positive health impacts of HFSS taxes are observed. The level of the tax and the pass-through onto consumer prices are important factors to induce behavioural change and subsequent health benefits.

Both benefits and costs of HFSS taxes tend to be higher for low-income groups. Per household, the increase in the HFSS tax rate caused additional expenditures of EUR 21 to 29 per household per year in Denmark (2011), EUR 24 to 35 in Poland (2021), EUR 9 to 11 in Belgium (2016), and 0.3 to 0.6 EUR in France (2019, when an existing SSB tax rate was reformed while keeping the median tax rate the same). We find that in most Member States, roughly 80% of households consume soft drinks, although there is no clear pattern in the percentage of households that buy soft drinks by income group. Nevertheless, in most Member States, the share of household income spent on soft drinks decreases with income, with lower income households spending higher proportions of income on drinks and, in particular, on products subject to SSB taxes. At the same time, changes in consumption patterns prompted by HFSS taxes also tend to deliver higher health benefits to low-income groups – particularly for heavy consumers.

Cross-border shopping related to HFSS taxation. Studies on a potential link between health taxation and cross-border shopping are sparse. We observe limited evidence of cross-border shopping, which can largely be linked to this phenomenon occurring between a few countries. Nevertheless, at the level of individual Member States, cross-border shopping can be noticed in certain locations, especially so in smaller jurisdictions (e.g., Belgium, Denmark and Portugal), where larger shares of consumers have access to more competitive offers across the border. However, it is difficult to isolate the role of HFSS taxes within global differences of price baskets across Member States, as much can be attributed to overall differences in price, VAT, and so on. For example, in Belgium, it is clear from price comparisons that tax rates at best explain only a small part of the total price differences with neighbouring jurisdictions.

Tax revenue generation and HFSS taxes. While intended to achieve health policy goals, HFSS taxes also generate tax revenue. Identifying clear-cut trends regarding revenue generation across the EU proves to be a complex exercise, since the effectiveness of HFSS taxes and, accordingly, their revenue potential depends on a complex mix of country-specific factors. Relative to gross domestic product (GDP), the revenues raised from existing HFSS taxes in the EU are modest, with substantial differences across Member States, ranging between 0.007% of GDP in Ireland to 0.12% of GDP in Hungary. The ability to raise tax revenues from excise taxation depends on demand and supply responses: the more a HFSS tax reduces the consumption of the taxed goods or triggers product reformulation, the less it can contribute to revenue generation and vice versa. Regarding the use of HFSS tax revenues, practices differ across Member States, with only a few Member States (Hungary, Poland and Portugal) earmarking HFSS tax revenues for specific health programmes.

KEY ELEMENTS FOR THE DESIGN OF HFSS TAXES

Experiences collected from Member States show that **HFSS taxes can be considered a potentially effective policy instrument** for Member States that wish to pursue health policy goals. However, to be truly effective, such taxes need to be carefully designed. In short, when introducing or modifying such taxes the following key design features must be taken into account:

a) HFSS taxes should be introduced at **central government level**, thus strengthening the functioning of the tax by reducing leakage and fragmentation within individual Member States;

b) **Tax rates** should not be at very low levels because the resulting change in consumer behaviour and associated health benefits might be too small to be identified. For low levels of taxation, the additional compliance costs for firms and tax authorities are hard to justify.

c) HFSS taxes should be **nutrient- and not product-based**; this allows and encourages manufacturers to reconsider, modify and reformulate their products – which can help to achieve the desired health outcomes.

d) **Transition periods**: after the announcement of the introduction or the amendment of an HFSS tax, a time lag allows businesses to respond through product reformulation before the tax is actually implemented.

e) Tax schedules should be **tiered or progressive** according to the targeted nutrient content, with a threshold below which products are tax-free. Again, this allows manufacturers to reformulate the products and encourages consumers to opt for healthier products. Ideally, such a progressive scheme is linked to nutrient labelling, raising consumers' awareness.

f) HFSS taxes should be implemented in the form of **specific excise taxes** (not ad valorem taxes).

g) HFSS taxes should **focus on SSBs** first of all, as these are easier to implement than other HFSS taxes and less vulnerable to definitional issues and potential legal challenges. HFSS taxes need to be designed in a way that is consistent with the defined health objective(s) and avoids discrimination between products which are comparable in view of such objectives.

h) The scope of SSB taxes should be drinks with **free and added sugar**, while the tax rate should be defined based on the amount of **total sugar**. As not all Member States tax artificial sweeteners as well as free sugars contained in milk-based products and fruit juices, the case for taxing such products is considered weaker.

i) **Exemptions for small independent producers** up to a certain threshold should be considered, because the compliance costs and tax burden are likely to be disproportionate for the smallest producers. At the same time, exemptions for products from the smallest producers will only have a minimal impact on the overall health outcome and revenues. Preferably, there should be alignment on an upper bound for such a small business exemption across the EU.

The following steps can improve the acceptability, feasibility, effectiveness and efficiency of HFSS taxes in general and SSB taxes in particular:

j) **HFSS tax schemes should be developed jointly by tax and health ministries** and communicated as a health instrument; HFSS taxes should be evidence-based and regularly evaluated against measurable (intermediate) goals.

k) HFSS taxes should be **part of a broader range of measures** including efforts to restrict the marketing, advertising and promotion of such products and to increase consumer awareness, through food labelling and education.

Excise taxes on HFSS products should be prioritised over initiatives related to reducing VAT on healthy food products. Although such VAT measures can help to incentivise positive changes in consumption behaviour, VAT reductions are less targeted and efficient than HFSS taxes. For instance, incomplete pass-

through for reduced VAT rates benefits producers and retailers at the expense of the public budget. At the same time, the exclusion of SSBs from reduced VAT rates applied to food in some Member States would be consistent with HFSS taxation.

WHAT WOULD BE THE BENEFITS OF AN EU APPROACH?

An EU-level approach is likely to contribute to EU health policy goals. Based on the large and increasing number of **SSB taxes** in Member States, these are a logical starting point.

Better alignment of national tax regimes, e.g. through coordination, or a **minimum level of harmonisation** of taxes would provide several benefits. Firstly, an EU framework would be beneficial for Member States that are currently considering the introduction of such a tax or will do so in the future. EU-level minimum harmonisation has the potential to reduce or prevent market fragmentation resulting from a growing number of divergent national SSB taxation schemes. Aligning the conditions for competition among comparable products would thus create **a level playing field**. It can improve public health outcomes by sending a **signal to consumers** regarding health risks associated with excessive consumption of SSBs and by encouraging Member States to take (bolder) taxation measures to **induce product reformulation** by producers.

Although a minimum harmonisation of SBB taxes at the EU level would primarily support health policy objectives, its impacts could be felt across a range of policies beyond. Our analysis confirms that there would be **no duplication or overlap with any of the existing measures** as there are no equivalents in place. Minimum harmonisation of SSB taxes would also be **complementary to and support** media, sports and education measures that already address the problem of NCDs and specifically diseases related to the excessive consumption of SSBs.

A simulation of three potential scenarios of an EU-wide minimum SSB tax highlights some of the most important mechanisms of such taxes. Their effects would be most profound in countries with low baseline prices for SSBs. Based on the data, EU-wide harmonised minimum SSB taxes would imply a comparably strong price increase for regular sugar carbonates in Slovakia, Romania and Greece. While this drives to a large extent the change in consumption, the implied reduction in average daily sugar intake also depends on the initial consumption patterns. The strongest reduction in the sugar intake is found in Slovakia and Czechia, but relevant reductions in sugar intake are also found in Member States like Bulgaria, Germany, Malta and Slovenia. **This translates into positive health effects, such as a reduction in BMI** and in the incidence of related diseases such as ischemic heart diseases and diabetes. Averaged across all EU countries, the resulting decrease in average BMI among the adult population ranges from 0.01 to 0.05. The incidence of diabetes is expected to decrease from 0.1 to 0.7 percent. Regarding the household characteristics, our simulation shows more beneficial health effects for the lower income households in most Member States.

GLOSSARY

Ad valorem tax: ad valorem tax is levied as a percentage of the price of a taxed good.

Added sugars: "sucrose, fructose, glucose, starch hydrolysates (glucose syrup, high-fructose syrup) and other isolated sugar preparations used as such or added during food preparation and manufacturing – excluding the naturally occurring sugars present in unsweetened fruit juice or honey (based on the European Food Safety Agency's (EFSA's) opinion on Dietary Reference Values for carbohydrates and dietary fibre).

Artificial sweeteners: Following EFSA's definition, sweeteners are classified into two categories: high-intensity sweeteners – substances with an intense sweet taste and with no energy value that are used to replace sugars in foods – and polyols – defined as "alcohols containing more than two hydroxyl groups". Polyols are low-calorie sugar replacers, which can also exert other technological functions in food besides sweetening.

Consumption behaviour: the study "of the processes involved when individuals or groups select, purchase, use, or dispose of products, services, ideas, or experiences to satisfy needs and desires"; based on Solomon, M. (1995) "Consumer Behaviour" (3rd edition), New Jersey: Prentice Hall.

Corrective or Pigouvian tax: taxes designed to correct inefficiencies of the price system that are due to negative external effects.

Cost pass-through: the extent to which the tax burden is transferred from taxed economic operators (manufacturers and importers) to consumer prices.

Cross-border shopping: refers to the practice of private individuals purchasing goods for personal consumption from retailers located in neighbouring countries. This typically involves individuals crossing national borders to take advantage of differences in prices (e.g. due to lower or non-existent taxes on purchased items in neighbouring countries).

Cross-border trading: The selling and buying of goods between neighbouring countries by economic operators (business to business transactions).

Earmarking: the designation of public revenues for a particular purpose. In this context it refers to the hypothecation of health tax revenues for health and social programmes (e.g. health promotion or NCD-prevention-related activities).

Excise Monitoring and Control System (EMCS): a computerised system for recording and monitoring the movement of harmonised excise goods (alcohol, tobacco and energy products) in the territory of the EU.

Food high in fat, sugar or salt (HFSS): these are foods and non-alcoholic beverages containing nutrients and substances with a nutritional or physiological effect, in particular fat, trans-fatty acids, salt or sodium and sugars, of which excessive intakes in the overall diet are not recommended for health reasons or that otherwise do not fit national or international nutritional guidelines.

Fruit juice: the fermentable but unfermented product obtained from fruit, which is sound and ripe, fresh or preserved by chilling, of one or more kinds mixed together, having the characteristic colour, flavour and taste typical of the juice of the fruit from which it comes. Flavour, pulp and cells from the juice which are separated during processing may be restored to the same juice.

Concentrated fruit juice: the product obtained from fruit juice of one or more kinds by the physical removal of a specific proportion of the water content. Where the product is intended for direct consumption that removal will be of at least 50%.

Fruit nectar: the fermentable but unfermented product obtained by adding water and sugars and/or honey to fruit juices, fruit puree or a mixture of those products.

Harmonisation: the act of making systems or laws the same or similar in different companies, countries, etc. so that they can work together more easily.

Health impact: a cumulative effect of the direct and indirect effects on individual and/or public health, impacting the demand and supply side[2].

Health taxes: in this report, an encompassing term that includes any levies imposed on products based on their sugar, fat or salt content. The term "HFSS taxes" is used throughout the report. Alcohol and tobacco taxes, generally also included under the umbrella term of "Health taxes", are outside the scope of this report.

Non-communicable diseases: diseases that are not spread through infection or through other people but correlated with unhealthy behaviours.

Non-sugar sweeteners: all synthetic and naturally occurring or modified non-nutritive sweeteners that are not classified as sugars. Sugar alcohols and low-calorie sugars are not considered to be non-sugar sweeteners.

Obesity: being overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. A body mass index (BMI) over 25 is considered overweight, and over 30 is obese.

Price elasticity of demand: measures the variation in the quantity of demand for a specific product that is associated with a variation in the same product's price. Price elasticity is expressed in positive or negative coefficients (e.g. a price elasticity of -1 means that a price increase of 10% reduces demand by 10%). Own-price elasticity measures the percentage change in demand in reaction to a one percent increase in the product price, while cross-price elasticity measures the percentage change in demand for a good if the prices of other goods change by one percent.

Product reformulation: practice of manufacturers changing the composition or ingredients of a product.

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[2] Cornelsen L, Green R., Dangour A., Smith R. (2015) Why fat taxes won't make us thin, Journal of Public Health, 37, 1, March, pp. 18-23, https://doi.org/10.1093/pubmed/fdu032"

Product substitution: phenomenon where consumers switch from one product to another. This can typically occur for various reasons, such as changes in products' availability, pricing, or consumer preferences.

Randomised controlled trial: prospective studies that measure the effectiveness of a new intervention or treatment.

State aid: a term that refers to forms of state-controlled financial resources, given to undertakings on a discretionary basis, with the potential to distort competition and affect trade between Member States of the EU.

Sugars: added sugars refer to "sucrose, fructose, glucose, starch hydrolysates (glucose syrup, high-fructose syrup) and other isolated sugar preparations used as such or added during food preparation and manufacturing" – excluding the naturally contained sugars present in unsweetened fruit juice or honey. Total sugars incorporate the sum of free sugars and endogenous sugars present in fruits, vegetables, cereals, as well as lactose in milk products.

Free sugars: added sugars plus those naturally present in honey and syrups, as well as in fruit and vegetable juices and juice concentrates.

Added sugars: added sugars are those added to foods during processing, cooking etc., eaten separately, or added to food at the table.

Soft drinks: Soft drinks are defined as water-based flavoured drinks usually with added carbon dioxide and with nutritive, nonnutritive, and/or intense sweeteners with other permitted food additives.

Sugar-sweetened beverages (SSB): according to the World Health Organization (WHO), SSBs are defined as all types of beverages containing free sugars. This includes carbonated or non-carbonated water-based soft drinks, fruit/vegetable juices and drinks, fruit juice (liquid and powder) concentrates, flavoured water, energy and sports drinks, ready-to-drink tea, ready-to-drink coffee, and flavoured milk drinks. Many studies rely on the definition provided by the Centre for Disease Control and Prevention (CDC), defining SSBs as "all non-alcoholic beverages, including sweetened milks or milk alternatives, tea and coffee drinks, energy drinks, sports drinks, sweetened water and juices, non-diet sodas that contain added sugars – typically high fructose, corn syrup or sucrose – or sugar substitutes. The identification of SSBs is based on the presence of ingredients such as corn syrup, high fructose corn syrup, sucrose, brown sugar, glucose, dextrose, honey, invert sugar, molasses, cane sugar or fruit juice concentrates".

Sweeteners: food additives which are used to impart a sweet taste in foodstuffs and/or as table-top sweeteners.

QALYs, DALYs and HALYs: metrics used to measure the value of health outcomes (i.e. the burden of disease and the impact of health interventions), combining the length and quality of life. QALYs stands for Quality-Adjusted Life Years and measures the years lived in perfect health gained due to an intervention or treatment. DALYs stands for Disability-Adjusted Life Years and measures the years of life lost due to premature mortality and the years lived with a disability due to prevalent cases of a disease or health condition in a

population. HALYs stands for Health-Adjusted Life Years and are an aggregation of life years adjusted for the quality of life lived during those life years.

1. INTRODUCTION

1.1. Background and objectives of the study

Not less than 100 million European citizens are affected by non-communicable diseases (NCDs) such as cardiovascular diseases, diabetes and cancer.[3] A growing body of evidence links the consumption of foods high in fat, sugar or salt (HFSS) to various NCDs[4], with excessive consumption of HFSS foods in unhealthy diets representing a major risk factor for NCDs.[5] This makes for a robust basis for implementing health policies, including tax policies, that aim to create a shift towards healthier food.

Policymakers strive to identify the most effective policy interventions to reduce the prevalence of such diseases. The World Health Organization (WHO) asserts that one of the most cost-effective ways of tackling NCDs involves implementing HFSS taxes. These taxes aim to reduce the consumption of unhealthy products.[6]

Both the European Food Safety Authority (EFSA) and the WHO recognise sugar-sweetened beverages (SSBs) as among the leading sources of free sugars in many countries, noting their non-essential nature in individuals' diets.[7] EFSA identifies consumers of SSBs as having higher added/free sugar intake than consumers of other food groups across most European countries and age groups.[8] Despite the lack of a scientific consensus on an evidence-based Tolerable Upper Intake Level[9] (UL) for sugars, scientists agree to varying degrees of certainty on the links between sugar intake and a range of health issues.[10] While EFSA could not set a UL or a safe level for sugar intake, it concluded that the intake of added and free sugars should be as low as possible in the context of a nutritionally adequate diet. It also concluded that decreasing the intake of added and free sugars would decrease the intake of total sugars to a similar extent. Furthermore, EFSA concluded that the food groups that contribute the most to the intake of added and free sugars in European countries were sugars and confectionery (i.e., table sugar, honey, syrups, confectionery and water-based sweet desserts), followed by beverages (SSBs and fruit juices) and fine bakery wares, with high variability across countries. The WHO concurs and recommends a reduced intake of free sugars throughout the life course (strong recommendation) and reducing the intake of free sugars to less than

[3] According to the EU non-communicable disease initiative (FAGs, p.6), 63 million people are living with cardiovascular diseases, 32 million were diagnosed with diabetes (with an additional 24 million undiagnosed) and 2.7 million cancer patients are expected to be diagnosed.

[4] WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets; WHO (2015), Fiscal Policies for Diet and Prevention of Noncommunicable Diseases, available *here*; EFSA (2022), Sugar consumption and health problems, available here;

[5] Get the Facts: Sugar-Sweetened Beverages and Consumption, Centre for Disease Control and Prevention, Source: https://www.cdc.gov/nutrition/data-statistics/sugar-sweetened-beverages-intake.html; Health promotion and disease prevention knowledge gatewav, Source: https://knowledge4policy.ec.europa.eu/health-promotion-knowledge-gateway/sugars-sweeteners-4_en

[6] Health taxes - Policy and practice, Lauer, Jeremy A., Sassi, F., Soucat, Agnes L. B., Vigo, Angeli, World Health Organization (WHO) https://doi.org/10.1142/9781800612396_fmatter

[7] WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets

[8] EFSA (2022), Sugar consumption and health problems, available here

[9] Defined by EFSA as the maximum level of total chronic intake of a nutrient from all sources judged to be unlikely to pose a risk of adverse health effects in humans, EFSA scientific opinion on Tolerable upper intake level for dietary sugars, doi: 10.2903/j.efsa.2022.7074

[10] EFSA (2022), Sugar consumption and health problems, available here.

10% of total energy intake (strong recommendation, while suggesting a further reduction).

Consequently, HFSS products, including SSBs, have emerged in recent years as a target for regulation. Data from the World Bank shows that as of August 2023, national taxes on SSBs were implemented in 117 countries and territories worldwide, covering 57% of the global population.[11] Globally, a greater proportion of people in lower-income countries are subject to a SSB tax compared to people in higher-income countries.

1.2. Scope of the study

This study contributes to the growing body of evidence on the implementation of HFSS taxes within EU Member States.[12] Conducting an analysis of existing HFSS taxes at the national level across the EU will address existing data gaps, providing the European Commission with data and analyses, particularly in relation to revenue generation, consumer behavioural change, health effects, redistributive impacts, effects on producers and internal market aspects.

Against this background, *the study's objective is to provide a foundation for initial discussions with EU Member States on advancing HFSS taxes in general and particularly SSB taxes within a European framework.*

Thereto, the study explores:

1) **the existing HFSS taxes within EU Member States** covering the period from 2009 to 2021. Experiences before 2009 are considered only in terms of their relevance to long-term effects. While the study addresses the taxation of HFSS food products in general, a specific focus is placed on SSBs. This aligns with the current global taxation practice and the focus of the established literature on SSBs;

2) **the rationale of establishing an EU harmonised tax framework for HFSS products;**

3) **whether an EU minimum level of harmonisation for a targeted SSB tax would add value.**

Contrary to some more qualitative studies carried out at EU level to date, this study is working with quantitative data and simulations where possible. The study methodology includes desk research, a comprehensive literature review, consultation activities with a broad range of stakeholders and econometric analysis. In addition, four case studies were prepared to develop in-depth insights into relevant HFSS taxes and their effects at the national level. The case studies are based on a combination of desk research, a literature review, consultation activities and input from the econometric analysis. Based on data availability and considering the variety in tax design features as well as geographical balance, the following case study countries were selected:

[11] World Bank, Health Taxes: Sugar Sweetened Beverage (SSB) Taxes.
[12] The scope of the study is on HFSS taxes. The use of the term 'health taxes' in the title of the study highlights the important health aspects of these taxes.

Belgium, Denmark, France, and Poland. A full description of the methodology is provided in Annex III.

This study also examines possible opportunities and challenges for the implementation of a harmonised SSB tax framework and its impacts. It does so based on the information collated on experiences at national level and as such does not explore alternative routes, such as the taxation of sugar during importation or production. Overall, the study findings are based on a triangulation of various methodological approaches and data sources: desk research, a literature review, econometric analysis, and consultation activities, which included interviews, online surveys and workshops.

Finally, as mentioned above, the study is explorative in nature and therefore it should not be seen as supporting an impact assessment as defined in the Better Regulation guidelines.

2. ANALYSIS OF NATIONAL HFSS TAXES IN THE EU

This chapter presents an overview of HFSS taxes currently levied in EU Member States. First of all, the rationale of such taxes is presented, and an overview of their prevalence throughout EU Member States is provided (chapter 2.1). The chapter then examines the various effects of HFSS taxes, encompassing their influence on the supply side (i.e. cost pass-through and product reformulation) and demand side (i.e. price elasticity, changes in consumption, product substitution, affordability and cross-border shopping) as well as indirect health effects (chapter 2.2). The chapter then undertakes an analysis of the HFSS taxes in practice including revenue generation and tax avoidance as well as an overview of the costs and benefits across various stakeholder groups (chapter 2.3).

2.1. Rationale and overview of HFSS taxes across the EU

2.1.1. Health risks posed by HFSS products and related societal costs

The scientific literature provides evidence that links the overconsumption of HFSS products, including SSBs, to the occurrence of NCDs, particularly an increased risk of chronic metabolic diseases. Overconsumption of fat and salt can have profound and detrimental effects on overall health. Excessive intake of dietary fats, particularly saturated and trans fats, is strongly associated with an increased risk of cardiovascular disease, coronary heart disease, and all-cause mortality.[13] High salt consumption has been linked to hypertension (i.e. high blood pressure), which is a major risk factor for cardiovascular disease, coronary heart disease, and stroke.[14] High salt intake also contributes to a range of other health outcomes such as kidney stones, obesity and osteoporosis.[15]

As for sugar overconsumption, for instance, there is consistent and compelling evidence that links a high intake of SSBs to an increased risk of being overweight

[13] World Health Organization (2023), 'Saturated fatty acid and trans-fatty acid intake for adults and children: WHO guideline', available here

[14] World Health Organization (2023), 'WHO Global Report on Sodium Intake Reduction', available here

[15] Ibid.; Cappuccio FP, Kalaitzidis R, Duneclift S, Eastwood JB. Unravelling the links between calcium excretion, salt intake, hypertension, kidney stones and bone metabolism. J Nephrol. 2000;13(3):169–77; Moosavian SP, Haghighatdoost F, Surkan PJ, Azadbakht L. Salt and obesity: a systematic review and meta-analysis of observational studies. Int J Food Sci Nutr. 2017;68(3):265–77. doi:10.1080/09637486.2016.1239700

and obesity[16], type 2 diabetes[17], and dental caries[18]. A meta-analysis by Wang et al. (2015) on the association between SSB consumption and type 2 diabetes finds that higher SSB intake is associated with an increased risk of developing type 2 diabetes.[19] Similarly, a recent systematic review and meta-analysis by Nguyen et al. (2023)[20] reaffirms and updates prior evidence that SSB consumption is associated with higher body mass index (BMI) and body weight in children and adults. Specifically, the authors note that increased SSB intake is associated with a 0.07 kg/m^2 higher BMI for children and a 0.42 kg higher body weight for adults. Similarly, randomised clinical trials (RCTs) performed with groups of children indicate a lowered BMI gain with SSB reduction interventions.[21]

There is also growing evidence linking SSB consumption to metabolic syndrome,[22] cardiovascular disease risk factors (including hypertension and dyslipidaemia),[23] non-alcoholic fatty liver disease,[24] and several cancers, e.g., pancreatic cancer.[25] For instance, a recent study by the American Cancer Society (2022) shows that regular consumption of SSBs increases the risk of mortality from obesity-related cancers, including gastrointestinal, postmenopausal breast, endometrial and kidney cancer.[26]

Moreover, the EFSA panel on Nutrition, Novel Foods and Food Allergens (2022) finds evidence (from RCTs on surrogate disease) for a positive and causal relationship between the intake of added/free sugars and the risk of chronic metabolic diseases (obesity, dyslipidaemia, non-alcoholic fatty liver disease,

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[16] Ruanpeng D, Thongprayoon C, Cheungpasitporn W, Harindhanavudhi T. Sugar and artificially sweetened beverages linked to obesity: a systematic review and meta-analysis. QJM 2017;110:513–20; Malik VS, Pan A, Willett WC, Hu FB. Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. American Journal of Clinical Nutrition. 2013; 98(4):1084-102; Te Morenga L, Mallard S, Mann J. Dietary sugars and body weight: systematic review and meta-analyses of randomised *controlled* trials and cohort studies. BMJ 2012;345:e7492; Trumbo PR & Rivers CR. Systematic review of the evidence for an association between sugar-sweetened beverage consumption and risk of obesity. Nutr Rev. 2014; 72, 566–574; Bleich SN and Vercammen KA. The negative impact of sugar sweetened beverages on children´s health: an update of the literature. BMC Obesity, 2018;5:6.

[17] Greenwood DC, Threapleton DE, Evans CEL, et al. Association between sugar-sweetened and artificially sweetened soft drinks and type 2 diabetes: systematic review and dose–response meta-analysis of prospective studies. *Br J Nutr* 2014;112:725–34; Malik, V. S., B. M. Popkin, G. A. Bray, J.-P. Despre´s, W. C. Willett, and F. B. Hu. Sugar-Sweetened Beverages and Risk of Metabolic Syndrome and Type 2 Diabetes: a Meta-Analysis. Diabetes Care. 2010; 33(11), 2477–248; Imamura F, O'Connor L, Ye Z, Mursu J, Hayashino Y, Bhupathiraju SN, Forouhi NG. Consumption of sugar sweetened beverages, artificially sweetened beverages, and fruit juice and incidence of type 2 diabetes: Systematic review, meta-analysis, and estimation of population attributable fraction. British Medical Journal. 2015; 351:h3576

[18] Bleich SN and Vercammen KA. The negative impact of sugar sweetened beverages on children´s health: an update of the literature. BMC Obesity, 2018;5:6.

[19] Wang M, Yu M, Fang L, Hu RY. Association between sugar-sweetened beverages and type 2 diabetes: A meta-analysis. J Diabetes Investig. 2015 May;6(3):360-6. doi: 10.1111/jdi.12309. Epub 2014 Dec 11. PMID: 25969723; PMCID: PMC4420570.

[20] Nguyen M, Jarvis SE, Tinajero MG, Yu J, Chiavaroli L, Mejia SB, Khan TA, Tobias DK, Willett WC, Hu FB, Hanley AJ, Birken CS, Sievenpiper JL, Malik VS. Sugar-sweetened beverage consumption and weight gain in children and adults: a systematic review and meta-analysis of prospective cohort studies and randomized controlled trials. Am J Clin Nutr. 2023 Jan;117(1):160-174. doi: 10.1016/j.ajcnut.2022.11.008. Epub 2022 Dec 20. PMID: 36789935.

[21] Ibid.

[22] Malik VS and Hu FB. Sugar-Sweetened Beverages and Cardiometabolic Health: An Update of the Evidence. Nutrients 2019; 11; 1840. doi:10.3390/nu11081840; Malik, V. S., B. M. Popkin, G. A. Bray, J.-P. Despre´s, W. C. Willett, and F. B. Hu. Sugar-Sweetened Beverages and Risk of Metabolic Syndrome and Type 2 Diabetes: a Meta-Analysis. Diabetes Care. 2010a; 33(11), 2477–2483.

[23] Narain A, Kwok C, Mamas M. Soft drinks and sweetened beverages and the risk of cardiovascular disease and mortality: a systematic review and meta-analysis. Int J Clin Pract 2016;70:791–805; Kim Y, Je Y. Prospective association of sugar-sweetened and artificially sweetened beverage intake with risk of hypertension. Arch Cardiovasc Dis 2016;109:242–53.

[24] D. Turck, J. Castenmiller, S. De Henauw, K. Ildico Hirsch-Ernst, T. Bohn, H. K. Knutsen, A. Maciuk, I. Mangelsdorf, H J McArdle, A Naska, C Pelaez, K Pentieva, A Siani, F Thies, S Tsabouri, M Vinceti, Tolerable upper intake level for dietary sugars. EFSA Journal 2022;20(2):7074, https://doi.org/10.2903/j.efsa.2022.7074

[25] Chazelas E et al. Sugary drink consumption and risk of cancer: results from NutriNet-Santé prospective cohort. BMJ, 2019;365:l2408; Mueller N, Odegaard A, Anderson K, Yuan JM, Gross M, Koh WP, Pereira M. 2010. Soft drink and juice consumption and risk of pancreatic cancer: The Singapore Chinese health study. Cancer, Epidemiology, Biomarkers and Prevention 19(2):447-455

[26] American Cancer Society, New Study Shows Sugar-Sweetened Drinks Increase Risk of Cancer Mortality, Sept 15, 2022

type 2 diabetes, and hypertension).[27] Specifically, high sugar intake is associated with a moderate risk of obesity and dyslipidaemia (> 50–75% probability), a low risk for non-alcoholic fatty liver disease and type 2 diabetes (> 15–50% probability), and a very low risk for hypertension (0–15% probability).[28] At the same time, a review of prospective cohort studies does not support a positive relationship between the intake of dietary sugars, in isocaloric exchange with other macronutrients, and any of the chronic metabolic diseases or pregnancy-related endpoints. Based on the available data and related uncertainties, the EFSA panel (2022) recommends that the intake of added and free sugars should be as low as possible in the context of a nutritionally adequate diet.[29] While there is less evidence on impacts of artificial sweeteners, WHO released a guideline on the use of non-sugar sweeteners in 2023 and recommends against the use of such sweeteners to control body weight or reduce the risk of noncommunicable diseases[30].

According to Eurostat data for 2019, 9% of people aged 15 and over in the EU drank SSBs daily, while 6% drank such beverages 4-6 times and 19% did so 1-3 times a week, with variations across countries[31]. In general, males as children and adolescents consume the highest quantities of SSBs[32], while there is evidence that in high-income countries SSB consumption is negatively associated with socioeconomic status[33]. Estimations of the health burden attributed to diets high in SSBs show wide variations across countries, ranging from 46 Disability-Adjusted Life Years (DALYs[34])/100,000 in France to 246/100,000 in Bulgaria (Figure 1).

[27] D. Turck, J. Castenmiller, S. De Henauw, K. Ildico Hirsch-Ernst, T. Bohn, H. K. Knutsen, A. Maciuk, I. Mangelsdorf, H J McArdle, A Naska, C Pelaez, K Pentieva, A Siani, F Thies, S Tsabouri, M Vinceti, Tolerable upper intake level for dietary sugars. EFSA Journal 2022;20(2):7074, https://doi.org/10.2903/j.efsa.2022.7074

[28] Ibid.

[29] Ibid.

[30] Use of non-sugar sweeteners: WHO guideline. Geneva: World Health Organization; 2023. Licence: CC BY-NC-SA 3.0 IGO, available here

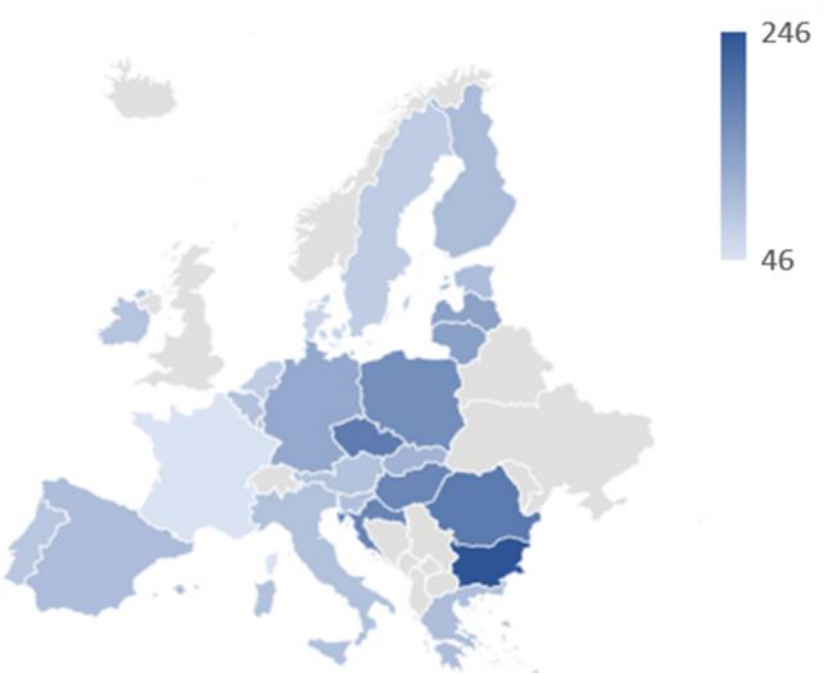
[31] Eurostat (2021), available here

[32] Ibid.; EC (2018), Fruit juices, sugar sweetened beverages and artificially sweetened beverages: consumption patterns and impact on overweight and obesity

[33] EC (2018), Fruit juices, sugar sweetened beverages and artificially sweetened beverages: consumption patterns and impact on overweight and obesity

[34] QALYs, DALYs and HALYs are used to measure the value of health outcomes (i.e. the burden of disease and the impact of health interventions), combining the length and quality of life. QALYs stands for Quality-Adjusted Life Years and measures the years lived in perfect health gained due to an intervention or treatment. DALYs stands for Disability-Adjusted Life Years and measures the years of life lost to due to premature mortality and the years lived with a disability due to prevalent cases of a disease or health condition in a population. HALYs stands for Health-Adjusted Life Years and are an aggregation of life years adjusted for the quality of life lived during those life years.

Figure 1: Disability-Adjusted Life Years (DALYs)/100,000 attributable to a diet high in SSBs in EU Member States (2019)



Source: Ecorys based on EC Knowledge for policy - Health Promotion and Disease Prevention Knowledge Gateway, https://knowledge4policy.ec.europa.eu/health-promotion-knowledge-gateway/sugars-sweeteners-dalys_en. Note: data is based on the Global Burden of Disease Study (2019) results.

The social and economic impacts of both obesity and NCDs are substantial in EU Member States. Beyond its impact on health, obesity constitutes a major challenge to social and economic policies.[35] According to the OECD (2019), overweight and obesity reduce life expectancy, increase health costs, decrease workers' productivity and lower GDP.[36] For instance, the burden resulting from obesity relates to an increased risk of social exclusion among people concerned, leading to lowered productivity, increased dependence as well as lowered economic status and educational attainment. Health-economic estimates find that the economic burden of obesity is substantial in Europe and highlight the potential health benefits and changes in health care costs associated with a reduction in BMI. For instance, a systematic review of the health-economic burden of obesity in Europe by Müller-Riemenschneider et al. (2008) reports **obesity-related health care costs of up to €10.4 billion**, with a relative economic burden ranging from 0.09% to 0.61% of GDP.[37] In a more recent study, Hoogendoorn et al. (2023) estimate that the total lifetime health care costs for obese people aged 40 and with a BMI of 35 kg/m^2 range from €75,376 in Greece to €343,354 in the Netherlands. They estimate that life expectancies range from 37.9 years in Germany to 39.7 years in Spain.[38] Conversely, a one-unit decrease in BMI is related to life expectancy gains

[35] Brukało, K., Kaczmarek, K., Kowalski, O., & Romaniuk, P. (2022). Implementation of sugar-sweetened beverages tax and its perception among public health stakeholders. A study from Poland. Frontiers in Nutrition, 9, 29 July: https://doi.org/10.3389/fnut.2022.957256

[36] OECD, The Heavy Burden of Obesity (Oct. 2019)

[37] Müller-Riemenschneider F, Reinhold T, Berghöfer A, Willich SN. Health-economic burden of obesity in Europe. Eur J Epidemiol. 2008;23(8):499-509. doi: 10.1007/s10654-008-9239-1. Epub 2008 May 29. PMID: 18509729.

[38] Hoogendoorn M, Galekop M, van Baal P. The lifetime health and economic burden of obesity in five European countries: what is the potential impact of prevention? Diabetes Obes Metab. 2023 Aug;25(8):2351-2361. doi: 10.1111/dom.15116. Epub 2023 May 24. PMID: 37222003.

between 0.65 and 0.68 years and a corresponding significant decrease in obesity-related health care costs.[39]

Similarly, the social and economic costs of chronic NCDs are significant. Duckett et al. (2016) point out that the social and economic costs of NCDs include reduced employment, increased absenteeism, and lowered productivity due to premature mortality or morbidity. Furthermore, they note reduced tax revenue as well as higher public expenditure on health and welfare as additional consequences.[40] In addition, the cost of treating these diseases is significant, reducing disposable income to spend on other goods and/or services when borne by individuals and public funds for other sectors when borne by the state.

Being overweight (pre-obesity) and obesity are multidimensional issues, with no single cause and solution. They are linked to food environments, dietary decision-making and nutritional status. Food environments are defined as "the collective physical (e.g. food availability, quality), economic (e.g. food prices), policy and sociocultural surroundings, opportunities and conditions that influence people's food and beverage choices and nutritional status".[41] Specifically, this comprehensive definition refers to drivers of food choices and nutritional status, including food availability, quality, marketing, prices, policies and dietary rules, and norms and beliefs (i.e., sociocultural factors).[42]

Food environments are recognised as the primary drivers of unhealthy diets, obesity and overweight in the literature.[43] This is supported by findings from our survey conducted with civil society (NGOs and consumer organisations), with approximately **90% indicating food environment as the main barrier preventing consumers making healthy dietary choices**. Relatively lower prices of unhealthy food (80%), along with the convenience of processed food (70%) and insufficient health measures addressing the food marketing and promotion practices (67%), are indicated as key contributors to unhealthy diets[44].

SSBs are widely available and heavily promoted in the food environment, **hence they are easy to overconsume and can also contribute to the overconsumption of sugars**. **SSB consumption is a modifiable risk factor for NCDs**, as acknowledged by scientific literature and stressed by international organisations such as the WHO and EFSA. As noted by

[39] Ibid.

[40] Duckett S and Swerissen H. A sugary drinks tax: Recovering the community costs of obesity. Melbourne, Australia: Grattan Institute, 2016.https://grattan.edu.au/wpcontent/uploads/2016/11/880-A-sugary-drinks-tax.pdf

[41] Swinburn, B, Sacks, G, Vandevijvere, S, Kumanyika, S, Lobstein, T, Neal, B, et al. INFORMAS (International Network for Food and Obesity/non-Communicable Diseases Research, Monitoring and Action Support): Overview and Key Principles. *Obes Rev* (2013) 14:1–12. Doi:10.1111/obr.12087

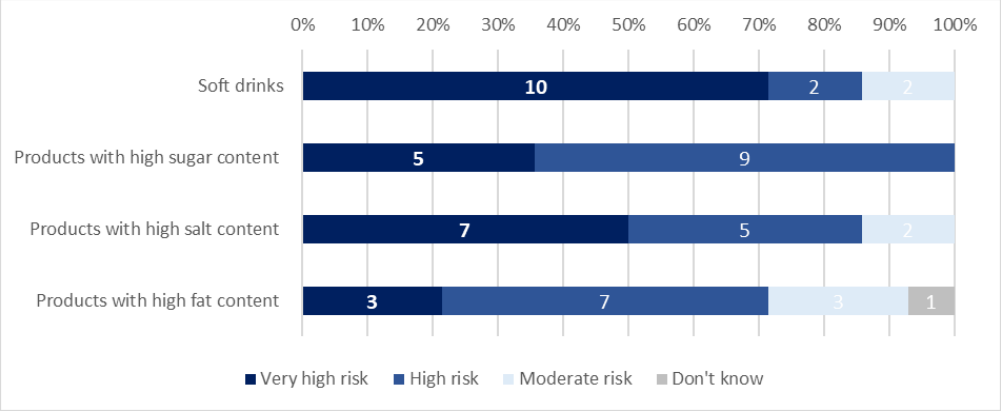
[42] Djojosoeparto SK, Kamphuis CBM, Vandevijvere S, Harrington JM, Poelman MP, JPI-HDHL Policy Evaluation Network. The Healthy Food Environment Policy Index (Food-EPI): European Union. An assessment of EU-level policies influencing food environments and priority actions to create healthy food environments in the EU. Utrecht, 2021, p. 5.

[43] Romieu, I, Dossus, L, Dossus, L, Barquera, S, Blottière, HM, Franks, PW, et al. Energy Balance and Obesity: what Are the Main Drivers? *Cancer Causes Control* (2017) 28(3):247–58. doi:10.1007/s10552-017-0869-z; Bray, GA, and Champagne, CM. Beyond Energy Balance: There Is More to Obesity Than Kilocalories. *J Am Diet Assoc* (2005) 105(5):17–23. Doi:10.1016/j.jada.2005.02.018; Sacks, G, Swinburn, B, Kraak, V, Downs, S, Walker, C, Barquera, S, et al. A Proposed Approach to Monitor Private-Sector Policies and Practices Related to Food Environments, Obesity and Non-communicable Disease Prevention. *Obes Rev* (2013) 14:38–48. doi:10.1111/obr.12074.

[44] Respondents were asked the following multiple-choice question: '*In your perception, what are the main barriers preventing consumers to make healthy dietary choices?'*.

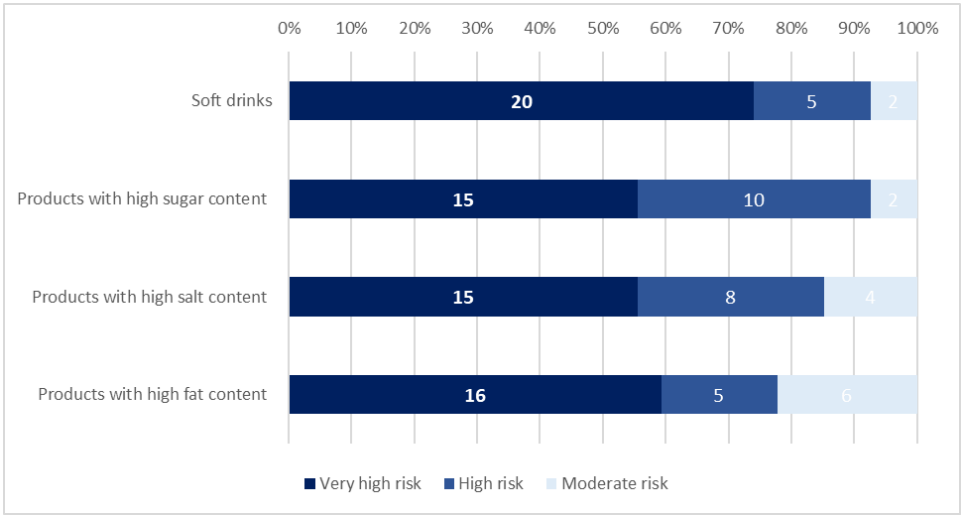
the WHO, SSBs offer limited nutritional benefits and are not essential parts of diets.[45] This is also confirmed by health authorities in EU countries, NGOs and consumer organisations consulted through interviews and the survey conducted within this study, which indicate that high-sugar products and soft drinks are highly risky from a public health perspective (Figures 2 and 3). The vast majority of national taxation and health authorities consulted through the survey further confirm the view that consumption of HFSS products is regarded as an increasing health risk concern among the general population, with 25% stressing their concerns, especially for children and young people.

Figure 2: Health authorities' perception of the level of risk of harmful effects across types of products



Source: Survey with health authorities (n=14); Question: From a public health perspective, does the risk of harmful effects vary across types of products? Please indicate the level of risk associated with different product categories.

Figure 3: Stakeholder perception of the risk of harmful effects across types of products



Source: Survey with NGOs and consumer organisations (n=27); Question: From a public health perspective, does the risk of harmful effects vary across types of products? Please indicate the level of risk associated with different product categories.

[45] WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets.

2.1.2. Rationale for the introduction of HFSS taxes

Obesity is multifactorial and a complex societal issue, which requires a strategic coordination of policy interventions across multiple settings and a broader policy range/package concerned with health promotion and disease prevention, as also confirmed by insights provided by the stakeholder consultations conducted in this study. Prevention is considered a key priority to tackling the obesity epidemic in the general population,[46] involving early detection, early intervention and greater access to specialist treatments and care services, e.g., psychological counselling.[47]

While there are many causes of NCDs beyond HFSS consumption, international experiences show that HFSS taxes can be considered a potentially effective policy instrument for Member States that wish to pursue health policy goals and help people to have healthier diets. There are several reasons to tax HFSS products, including addressing negative externalities (i.e. effects on others not taken into account by consumers and producers) and internalities (i.e. effects on own health insufficiently taken into account by individuals due to behavioural biases) resulting in social costs of these products. Beyond the potential impacts on dietary choices and consumer behaviour, another potential benefit of HFSS taxes is the revenue raised. While many HFSS taxes have been framed predominantly as public health measures, revenue generation still features as an additional important motivation in introducing such taxes for most countries. The fiscal and health objectives are closely interrelated. While the distortionary effects of taxes on behaviour are considered to lead to a welfare loss generally, in the presence of externalities or internalities a corrective or Pigouvian tax – like a HFSS tax – actually steers behaviour in the desired direction, which makes it an efficient way to raise government revenues. At the same time, both policy goals can be conflicting as the more the tax induces product reformulation or reductions in consumption, the less tax revenues can be expected.

In particular, HFSS taxes can influence people's behaviour and choices by raising prices of taxed products relative to other (i.e. healthier) products, increasing public awareness about health risks and incentivising industry responses (e.g., product reformulation). HFSS taxes can achieve their stated objectives by affecting both the supply and demand side of the market. In doing so, they are influenced by a complex mix of country-specific factors, including:

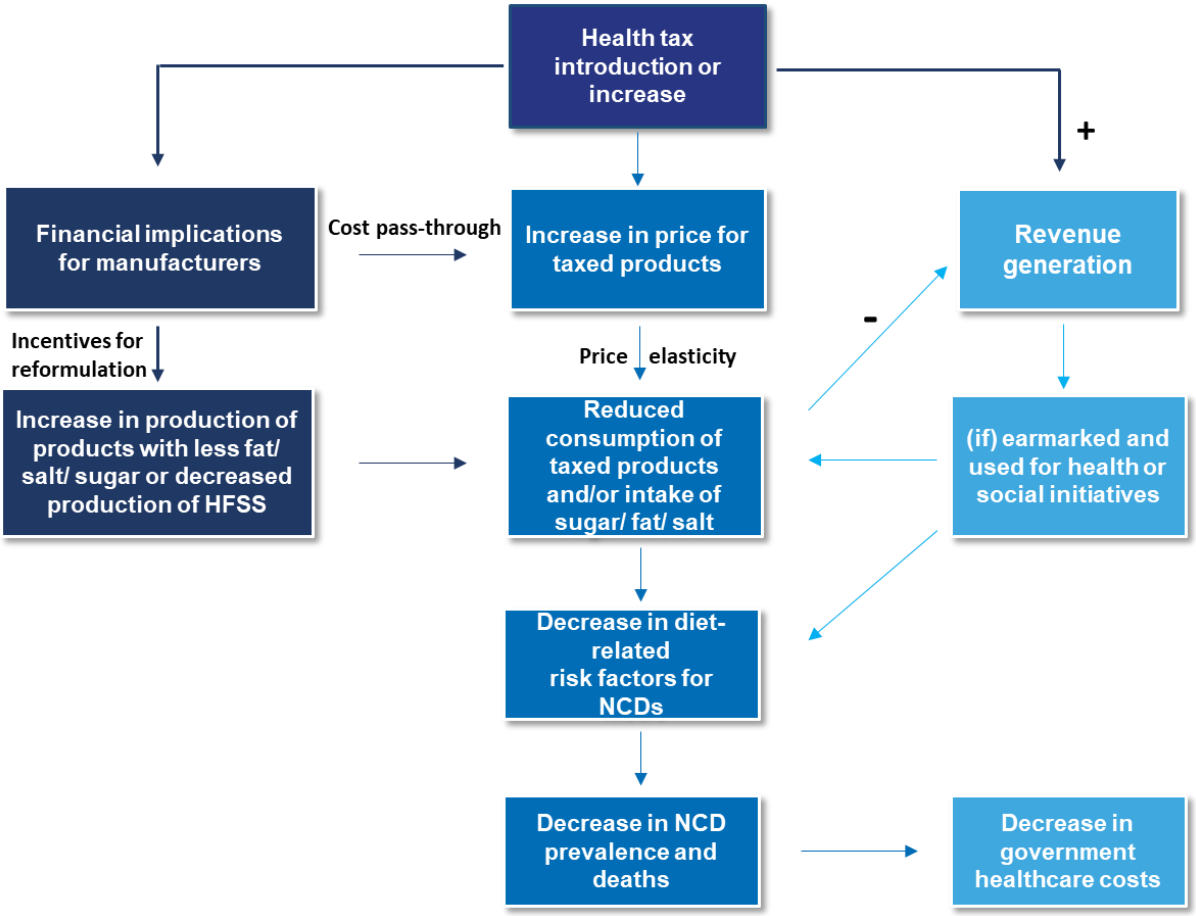
- the tax design, particularly the scope of the tax, including exemptions, the tax base, the tax structure and the level of tax rates;
- the extent of the underlying consumption of taxed products;
- the extent of tax pass-through, which is the extent to which the tax burden is transferred from economic operators to consumer prices;

[46] Interview with expert from the Flemish Knowledge Centre for eating and weight problems (Belgium).
[47] Ibid.

- how sensitive consumers are to such changes in price, namely the price elasticity of demand.

Figure 4 presents the rationale behind introducing HFSS taxes, capturing the main mechanisms through which the effects of such taxes materialise and reflecting the logic behind this particular policy intervention.

Figure 4: The rationale of HFSS taxes



Source: Ecorys' own elaboration based on WHO[48] and UNICEF[49].

A primary objective for the introduction of HFSS taxes worldwide is to improve the population's health by reducing consumption of taxed products. Whether HFSS taxes can induce behavioural changes in populations and deliver tangible public health benefits depends on a number of factors, as described in subsequent chapters in detail.

Across the EU, the rationale for the introduction of HFSS taxes differs between earlier and more recent taxes. Earlier European HFSS taxes were mainly justified as an additional means for revenue generation at the time of introduction, e.g. in Denmark (1946 and 1968), the Netherlands (1992), Finland

[48] WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets.
[49] UNICEF (2021), Policy brief: Sugar- Sweetened Beverage Taxation.

(1994, also taxing sugar-free products such as water and unsweetened juices), Croatia (1994[50]), Latvia (2004) and Belgium (2009[51]).

In recent years, the intention to achieve public health objectives through HFSS taxes has become more prominent in the political debate worldwide as well as in the EU. At the same time, the WHO's findings suggest that high-income countries tend to use HFSS taxes more for achieving health goals, while lower-income countries primarily use it for revenue.[52] Improved population health outcomes, and health policy commitments to reduce the incidence of being overweight and obesity and prevent NCDs, are among the most important reasons for the implementation of SSB taxes in EU Member States. In recent years, various amendments to these existing taxes have been made and justified on health grounds. In Latvia, for instance, changes to the law were announced in 2022 to encourage citizens to reduce their daily intake of high-sugar non-alcoholic drinks. Similarly, in Finland health guidance was added to the tax in 2014 (although the fiscal objective still plays an important role).[53]

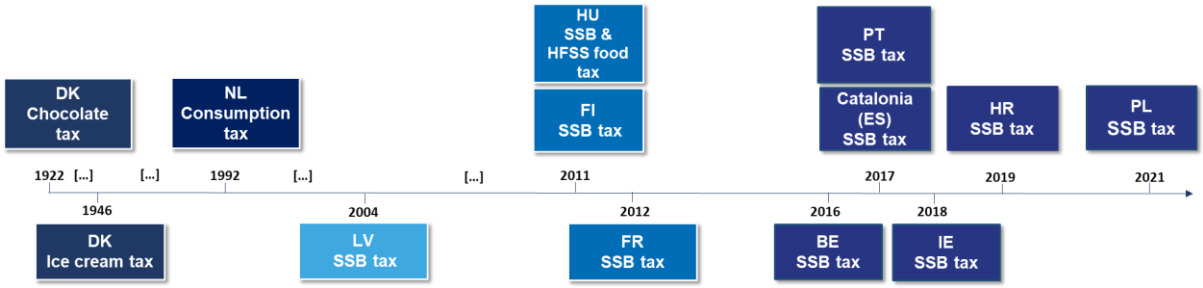
All of this arguably contributed in recent years to a sparking interest among policymakers and created **momentum in an increasing number of EU countries for the introduction of new HFSS taxes with a stated health objective to reduce consumption of HFSS products**. This is the case for instance for countries such as Portugal (2017), France (especially in the 2018 revision of the tax), Ireland (2018), Poland (2021), as well as the Spanish region of Catalonia (2017), where the tax narrative was based mostly on health considerations.

2.1.3. Overview of HFSS taxes across the EU

To date, 11 EU countries and the Spanish region of Catalonia have introduced some form of HFSS taxation, with nine Member States and Catalonia taxing solely SSBs, one Member State taxing a HFSS food product (Denmark: ice cream, chocolate and other confectionery) and one taxing both SSBs and HFSS food products (Hungary)[54]. The majority of these taxes has been implemented since the beginning of the 2010s (Figure 5).

[50] Excise tax on non-alcoholic drinks with no distinction between beverages with or without sugar and sweeteners. A subsequent reform in 2019 introduced tiered taxation based on sugar content, see annexes for more details.
[51] Excise tax on non-alcoholic drinks with no distinction between beverages with or without sugar and sweeteners. A subsequent reform in 2016 introduced a sugar tax, see annexes for more details.
[52] WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets.
[53] On soft drinks. Tax on confectionery and ice creams was abolished in 2017.
[54] The reader should note that Romania has introduced an excise duty on SSBs on 1 January 2024, just before the publication of this study. For this reason, the study does not examine the Romanian SSB tax.

Figure 5: Chronology of the introduction of HFSS taxes in the EU (still in place)



Source: Ecorys, own elaboration

As already noted, improving population health has been a primary objective for the introduction of HFSS taxes in the EU, while also raising governments' revenues at the same time. A recent study commissioned by HaDEA mapped fiscal measures on HFSS products, with a particular focus on the use of excise duties targeting SSBs[55]. In the countries studied[56], the study found the rationale for the tax measures ranged from health promotion by reducing consumption of unhealthy products and encouraging the industry to reformulate products to revenue generation for the national health system. Notably, in four Member States (**Hungary, Ireland, Poland, Portugal**) and the Spanish Region of **Catalonia**, SSB taxes were found to have an explicit public health goal.[57] The HaDEA study further notes that the rationale for introducing HFSS taxes was varied or unclear in some countries (**France, Belgium and Croatia**). In particular, in France the measure aimed to raise revenue, but also aimed to encourage reformulation and reduce the number of people who were overweight as well as obesity levels, particularly among children and young people. For Belgium and Croatia, there was no clear information on the precise rationale for tax implementation.[58]

Furthermore, the introduction of SSB taxes in **Belgium, Finland, Ireland, Hungary, Latvia and Portugal** was accompanied and underpinned by a multisectoral health policy approach in health promotion (WHO, 2022).[59] This point is also confirmed by the stakeholder interviews for the case study countries – **Belgium, Denmark, France, and Poland**.

The research undertaken in this study complements these findings by showing that the health rationale is a stated and key objective for the introduction of HFSS taxes across the EU Member States. For instance, the importance of health objectives is reflected in the findings of the survey conducted among tax and health authorities in countries with a HFSS tax in place. The survey asks authorities to indicate the importance of health and fiscal objectives when introducing a tax on HFSS products in their country. The vast majority (roughly

[55] HaDEA (2022), Mapping of pricing policies and fiscal measures applied to food, non-alcoholic and alcoholic beverages p. 33.
[56] 10 EU countries (Belgium, Croatia, France, Hungary, Ireland, Latvia, Netherlands, Poland, Portugal, Spain), plus Norway and the UK where taxes on HFSS products had been introduced or amended.
[57] Ibid., p. 36.
[58] Ibid., p. 37.
[59] WHO/Europe (2022), Sugar-Sweetened Beverage Taxes in the WHO European region: Success through lessons learnt and challenges faced. Geneva, p. 3.

70%) indicated that health objectives were extremely important in the decision to introduce such taxes[60]. It is interesting to note that tax authorities considered fiscal objectives to be, on average, comparatively less important (although still relevant) than health authorities[61].

The health objectives range from a general population health endpoint, i.e., to reduce the incidence of obesity and the NCD burden, to specific health or disease endpoints (e.g., regarding diabetes, dental health, childhood obesity), or raising complementary revenues to support health expenditure. In **Hungary, Poland and Portugal**, the taxes aim to reduce the consumption of unhealthy foods to tackle obesity, while raising revenue to support the health system[62]. In **Portugal,** the tax is designed to reduce SSB and sugar consumption and is thus linked explicitly to product reformulation.[63] The Portuguese legislation introducing HFSS taxes explicitly states that excise taxes comply with the principle of equivalence, seeking to charge taxpayers according to the costs they cause, namely in the fields of public health[64]. In **Poland**, the main rationale behind the introduction of the tax is health related, i.e. to tackle the growing burden of obesity and the number of people who are overweight by stimulating healthier eating behaviours within the population.[65] In **Hungary,** the tax is predominantly designed to reduce the consumption of SSBs and HFSS food products by stimulating product reformulation[66], and it was framed as "*Public health product tax" (NETA)*[67]. Health authorities were also involved and consulted for the introduction/design of the HFSS[68].

In the Spanish region of **Catalonia**, explicit reference is made to the negative impact of consuming sugary drinks on health, and the tax aims to encourage changes in consumption, following recommendations made by the WHO.[69] The law introducing the tax explicitly states that the purpose is to tax the consumption of packaged sugary drinks due to their harmful effects on the population's health[70]. In **France and Hungary**, the link between childhood obesity and sugar intake was raised as a particular concern.[71] Notably in **France,** the 2018 revision of the tax made health objectives more prominent,

[60] Authorities were asked to rank on a scale 0-5 the importance of health and fiscal objectives for the introduction of HFSS taxes. "Highly important" here means the objectives were assigned either 5 (maximum score, ~60% or respondents) or 4 (~10% of respondents).
[61] Roughly 30% of health authorities vs 20% of tax authorities consulted assigned the maximum score (5) when asked about the importance of fiscal objectives for the introduction of HFSS taxes.
[62] Hungary, Poland and Portugal earmark tax revenues from HFSS products for specific health programmes/ expenditure. See annexes for more details.
[63] Thow, A. M., Rippin, H. L., Mulcahy, G., Duffey, K., and Wickramasinghe, K. (2022). Sugar-sweetened beverage taxes in Europe: learning for the future. European Journal of Public Health, 32(2), 273-280.
[64] Código dos impostos especiais de consumo (CIEC), available here.
[65] Brukało, K., Kaczmarek, K., Kowalski, O., & Romaniuk, P. (2022). Implementation of sugar-sweetened beverages tax and its perception among public health stakeholders. A study from Poland. Frontiers in Nutrition, 9, 29 July: https://doi.org/10.3389/fnut.2022.957256.
[66] Hungarian Ministry of Health (2019). The Hungarian Public Health Product Tax; Thow, A. M., Rippin, H. L., Mulcahy, G., Duffey, K., and Wickramasinghe, K. (2022). Sugar-sweetened beverage taxes in Europe: learning for the future. European Journal of Public Health, 32(2), 273-280.
[67] NAV- National Tax and Customs Office - *Nemzeti Adó- és Vámhivatal (Népegészségügyi termékadó 2022. II. Félév*. Available here.
[68] Survey with Hungarian tax authority.
[69] WHO/Europe (2022), Sugar-sweetened beverage taxes in the WHO European Region: success through lessons learned and challenges faced. Copenhagen: WHO Regional Office for Europe.
[70] Ley 5/2017, available here
[71] Ibid; HaDEA (2022), Mapping of pricing policies and fiscal measures applied to food, non-alcoholic and alcoholic beverages, p. 37.

with a strong policy framing towards the health of young people and targeting industry practices (i.e. product reformulation).

In **Ireland**, the legislation was introduced at a time of growing concern about the rising incidence of NCDs, particularly related to obesity, with an objective to reduce the number of people who were overweight and obesity levels by reducing the consumption of SSBs and encouraging reformulation of these products, while still raising revenues.[72]

In **Belgium**, the implementation of the SSB tax was motivated by a dual combination of fiscal and public health objectives.[73] While the primary focus was initially on fiscal considerations, implicit health motivations also played a role in the adoption of the tax, which was framed as an effective measure to reduce health problems such as obesity, diabetes, and tooth decay.[74] For instance, the Scientific Institute for Public Health had stated that the number of Belgians suffering from obesity was on the increase.[75] A survey found that 14% of the population over 18 years of age were obese (i.e. a BMI above 30).[76]

While all 11 EU Member States and Catalonia that have introduced a HFSS tax did so in the form of specific excise taxes, differences exist regarding their other design features, especially the tax structure, levels of tax rates and major exemptions (Table 1). In particular, in eight Member States and Catalonia (all of them taxing SSBs) taxes are designed with progressive tax rates tiered by sugar content, type of products and/or ingredients, while three Member States apply uniform tax rates.

Table 1: Overview of HFSS taxes in the EU

Country	Name of measure	Tax structure	Lowest tax rate[77]	Major exemptions
BE	*Loi relative au regime d'accise des boissons non alcoolisées et du café / Wet betreffende het accijnsstelsel van alcoholvrije dranken en koffie* (Law on excise duty on non-alcoholic beverages and coffee)	Uniform tax rate (tiered by type of beverage and by type of ingredient)	€11.92 per hl (any sugar/sweetener content)	Fruit juices, vegetable juices and unfermented milk-based beverages
HR	*Zakon o posebnom porezu na kavu i bezalkoholna pića* (Special tax on coffee and non-alcoholic beverages)	Progressive tax rate (tiered by type of beverage, by type of ingredient and/or by sugar content)	€1.33 per hl (sugar content between 2-5 g/100 ml, €0 below 2g)	100% fruit and/or vegetable content with no added sugars or sweeteners

[72] Briggs, A.D., Mytton, O.T., Madden, D. et al. (2013); Thow, A. M., Rippin, H. L., Mulcahy, G., Duffey, K., and Wickramasinghe, K. (2022). Sugar-sweetened beverage taxes in Europe: learning for the future. European Journal of Public Health, 32(2), 273-280.
[73] WHO/Europe (2022), Sugar-sweetened beverage taxes in the WHO European Region: success through lessons learned and challenges faced. Copenhagen: WHO Regional Office for Europe.
[74] KBC Economics (2011, "A sugar tax, does it really work?" (23 Nov.), (accessed: 4 Apr. 2023).
[75] Ibid., (accessed: 4 Apr. 2023).
[76] Ibid., (accessed: 4 Apr. 2023).
[77] More details on countries' tiers and progressive rates are available in the country fiches in annex II.

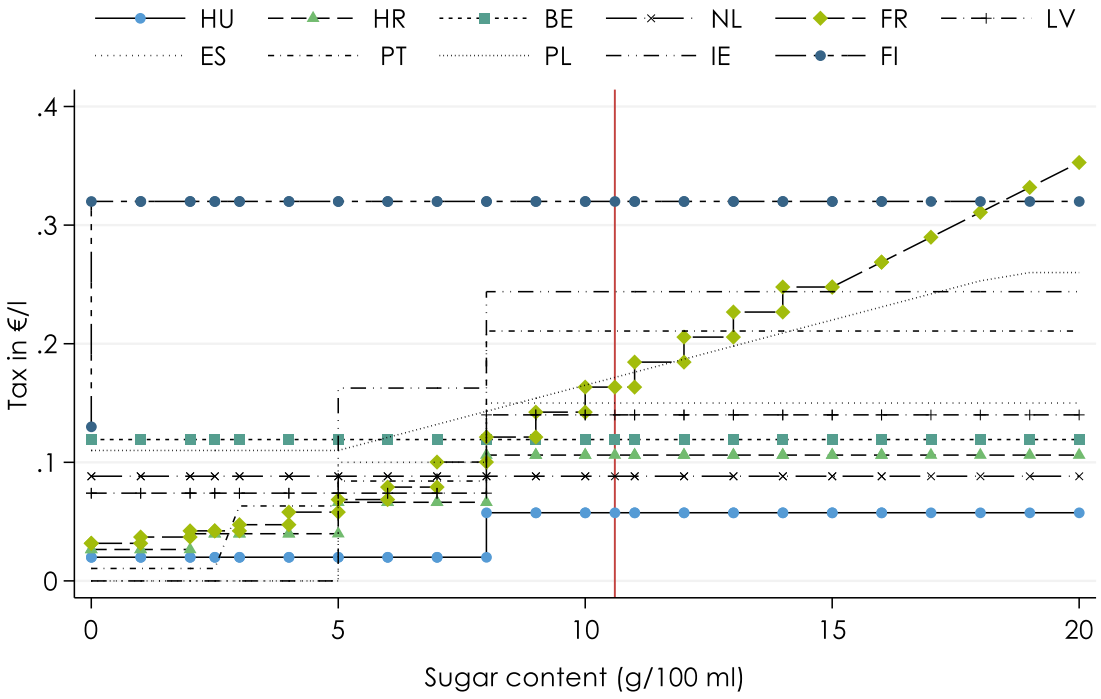
Country	Name of measure	Tax structure	Lowest tax rate[77]	Major exemptions
DK	*Afgift af konsumis (Ice cream tax)* *Afgift af chokolade og Sukkervarer (Chocolate and sweet confectionary tax)*	Progressive tax rate (tiered by sugar content)	€0.75/l for ice cream with sugar content ≤0.5g/100 ml €2.96/kg for confectionery with sugar ≤0.5g/100g	
FI	*Virvoitusjuomavero/ Punktskatt på läskedrycker* (Excise duty on soft drinks)	Uniform tax rate (tiered by type of soft drink and by ingredients used to prepare soft drinks)	€32 per hl (any added sugar)	Milk-based drinks
FR	*Contributions sur les boissons non alcooliques* (Contributions on non-alcoholic beverages)	Progressive tax rate (tiered by sugar content)	€3.17 per hl (sugar content up to 1g/100 ml)	Milk-based beverages, 100% juices, concentrates, soups
HU	*Népegészségügyi termékadó* (NETA, Public health product tax)	Progressive tax rate (tiered by type of product, by type of sweetener, and/or by type of HFSS ingredient)	€2 (800 HUF) per hl (SSBs with no added sugar but with sweeteners, or with no sweeteners but with added sugar <8g/ml) For salted snacks: €0.17/kg (65 HUF/kg) if <1g of salt per 100g. For seasoning: €1.04/kg (390 HUF/kg)	Soft drinks with a fruit or vegetable content of 25% or more, fruit juices and vegetable juices or drinks made using 50% milk-based ingredients
IE	*Cáin ar Dheochanna Siúcra-Mhilsithe* (CDSM, Tax on sugar-sweetened beverages)	Progressive tax rates (tiered by sugar content)	€16.26 per hl (sugar content 5g-8g/100 ml, €0 below 5g)	100% fruit juices, plant protein and milk-based drinks with calcium content > 119mg/l
LV	*Akcīzes nodoklis pārējām akcīzes precēm* (Excise duty on other excise goods)	Progressive tax rate (tiered by sugar content)	€7.4 per hl (sugar content ≤8g per 100 ml)	Beverages which contain ≥10% of juice (excl. concentrates) and not more than 10% of added sugar and which do not contain food additives or flavourings
NL	*Verbruiksbelasting op alcoholvrije dranken* (Consumption tax on non-alcoholic beverages)	Uniform tax rate	€8.83 per hl (will increase to €26.13 as of 1 January 2024)	Dairy drinks (if containing a minimum of 0.02 mass percentage of

Country	Name of measure	Tax structure	Lowest tax rate[77]	Major exemptions
				milk fats), mineral waters (as of 2024)
PL	*Opłata od środków spożywczych* (levy on foodstuffs)	Progressive tax rate (tiered by sugar content, by type of products, and by type of ingredients)	€11 per hl (sugar content ≤5g/ 100 ml or if there is at least one sweetener)	Beverages with >20% fruit or vegetable juice, if sugar content is ≤5g/100 ml, products in which milk or dairy are mentioned first in the ingredients list
PT	*Imposto sobre as bebidas adicionadas de açúcar ou outros edulcorantes* (Tax on beverages containing added sugar or other sweeteners)	Progressive tax rate (tiered by sugar content)	€1.05 per hl (sugar content <2.5g/100 ml)	Drinks based on milk, soy or rice, fruit, seaweed or vegetable juices and nectars
Catalonia (ES)	*Impost sobre begudes ensucrades envasades* (Tax on packaged sugary drinks)	Progressive tax rate (tiered by sugar content)	€10 per hl (sugar content 5-8g/ 100 ml, €0 below 5g)	Natural, concentrated fruit or vegetable juices, milk drinks that do not contain added caloric sweeteners

Source: Own elaboration based on country fiches.

Across EU countries, a rather broad range of tax rates for SSBs (in €/hl) exists. The considerable variations in the tax rates, also with regard to the sugar content (g/100ml), are illustrated in Figure 6 below. In Belgium, Finland and the Netherlands, the tax rates remain the same regardless of the sugar content, whereas in all other countries the rates differ considerably depending on the amount of sugar contained in taxable drinks.

Figure 6: Tax rates for different levels of sugar content in EU Member States with SSB taxes (2022) [78]



Source: WIFO based on information collected on tax rates.

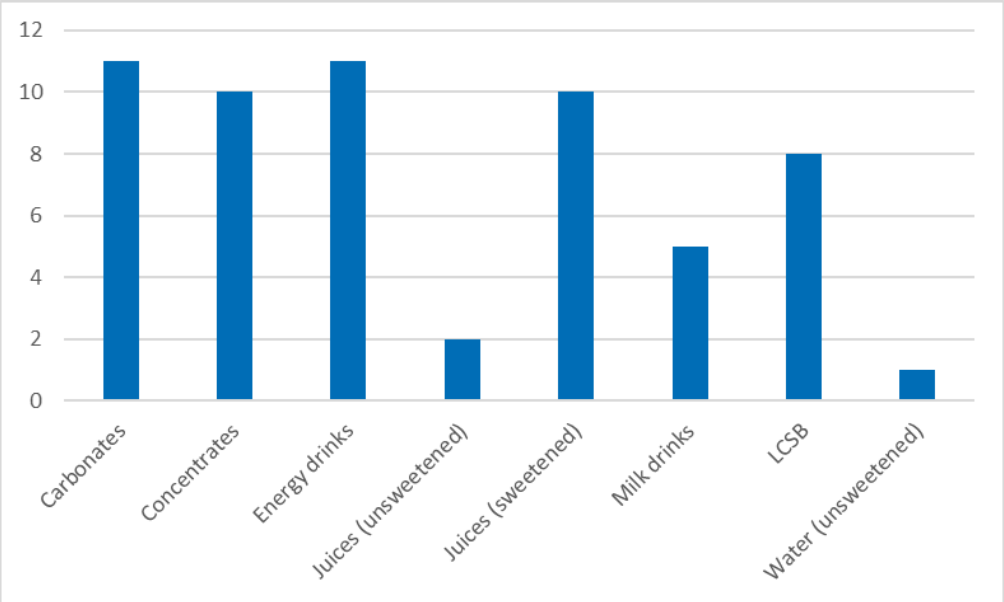
Practices differ across countries with SSB taxes regarding the definition and delineation of taxable products. While various products are sufficiently high in free sugars to warrant taxation, some of these also include other nutrients that may contribute to a healthy diet, which in turn might mitigate concerns regarding overall negative health impacts (e.g. proteins in milk) and thus are exempted from taxation in several Member States[79]. The ultimate choice of which products to tax should be informed by various factors, including a situational analysis assessing the size of a particular beverage market in a given country and the country-specific relative contributions of particular beverages to free sugar or caloric intakes.[80]

Some EU countries have opted for the inclusion of all, or most, subtypes of SSBs in the list of taxable products, including carbonated beverages, fruit/vegetable juices and drinks, fruit juice (liquid and powder) concentrates, flavoured water, energy and sports drinks, and milk-based drinks. This choice is generally driven by the objective of preventing undesirable substitution of taxed SSBs for untaxed SSBs, which may undermine the health objectives of SSB taxation. In particular, all of the EU countries with SSB taxes tax carbonates and energy drinks, and almost all of them also include concentrates and nectars (Figure 7).

[78] As a reference, the red vertical line represents the sugar content of a market leading cola (10,6g/100 ml) as the most consumed soft drink.
[79] For instance, milk products are exempted in Belgium, France, Hungary, Poland, Portugal and the Netherlands. In some countries specific conditions apply for exemptions, see country fiches for more details.
[80] WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets.

Unsweetened water is taxed only in Finland and the Netherlands (where mineral waters will be exempted as of 2024) and France does not tax concentrates.

Figure 7: Scope of SSB taxes in EU Member States – by type of drink



Source: Ecorys based on World Bank Global SSB Tax Database (version February 2023) and own research. Note: Low-calorie sweetened beverages (LCSB)[81]. N = 11 (i.e., 10 Member States and Catalonia taxing SSBs).)

In addition to the Member States already implementing HFSS taxes, more countries are considering the introduction of HFSS taxes or the expansion of existing ones. The HaDEA study[82] found that in six Member States (Bulgaria, Estonia, Italy, Luxembourg, Romania, and Spain), fiscal measures had been under discussion or were planned, but no additional measures were implemented during the implementation of the study. Such intentions encompass taxes on fast foods in Romania (announced in 2010 but dropped later), food taxes in Luxembourg (under discussion in 2013 but not implemented), a junk food tax in Bulgaria (discussed in 2015), and SSB taxes in Estonia (planned for 2017, but later dropped), Luxembourg (discussed in 2017 but not implemented) and Romania (proposed in 2019 but not implemented). [83]

The tax authorities survey undertaken in this study confirms that policy discussions or legislative drafts and initiatives also exist in other EU countries. The Czech tax authority indicated that currently there is an ongoing expert discussion at policy level on HFSS taxes[84]. In the Netherlands, which currently has a tax with a flat rate on all kinds of non-alcoholic beverages, the Ministry of Finance and the Ministry of Health, Welfare and Sports are currently exploring options for a differentiated tax on SSBs and a tax on sugar-containing

[81] Low/zero calorie sweetened beverages (LCSB) is defined by World Bank as non-alcoholic beverages sweetened with low/zero-calorie (high-intensity) sweeteners, such as aspartame and stevia. HS sub-heading 22.02.10.00.11 - Waters, including mineral waters and aerated waters, containing added sugar or other sweetening matter or flavoured - Carbonated soft drink - Containing high intensity sweeteners.
[82] HaDEA (2022), Mapping of pricing policies and fiscal measures applied to food, non-alcoholic and alcoholic beverages p. 33.
[83] Ibid., p. 36.
[84] National tax authority via survey.

products[85]. In Italy, the 2020 Budget Law established a tax on sweetened beverages, but the application of the tax was postponed to 2024.[86] Moreover, Slovakia tried to enact a SSB tax with a flat rate in 2019, initially based on an argument for revenue generation, then the emphasis was shifted to health considerations. However, the idea was abandoned due to strong opposition from economic operators and a change of government.[87] Also, 72% of health authorities surveyed expect the importance of HFSS taxes to substantially (30%) or partially (42%) increase in the next five years[88].

To conclude, several EU countries have already introduced HFSS taxes as part of a broader set of policy instruments to pursue health policy goals, tackle excessive HFSS consumption and encourage people to make healthier food and drink choices. Notably, momentum in the introduction of HFSS taxes has been observed since the early 2010s. While all Member States opted for the same type of tax (i.e. a specific excise tax), they pursued rather different approaches in terms of key design features, especially regarding the tax structure, tax rate levels and scope of the tax. The following chapters contribute to the growing body of evidence on the implementation of HFSS taxes within these EU Member States, by conducting analysis of existing national HFSS taxes at the national level across the EU, particularly in relation to their impact on the supply (cost pass-through and product reformulation) and demand side of the market (demand elasticity and consumer behavioural change, health outcomes, redistributive impacts and internal market aspects), as well as revenue generation.

2.2. Effects of HFSS taxes

2.2.1. Supply side effects of HFSS taxes

One of the channels via which HFSS taxes pursue their stated objectives is by incentivising industry responses. In particular, potential manufacturers' strategies around the introduction of a HFSS tax include:

a) The extent to which the tax is passed on to consumers (intended effect of the tax), or to which prices are lowered to gain a larger market share (cost pass-through);
b) Product reformulation by reducing the sugar content per litre or per kilogram and/or changes in the product portfolio through the introduction of new products or withdrawal of certain products from the market (intended effects of the tax).

An issue that could be further investigated but is not included in this study due to a lack of data, is the impact of advertising by brand producers or retailers to

[85] Letter from the state secretary for health, welfare and sport and the state secretary for finance to the house of representatives of the Netherlands (2022), available here in Dutch.
[86] National tax authority via survey. The law prescribes a uniform tax rate equal to €10/hl if sugar content exceeds 2.5g/100ml.
[87] Representative from Slovak Ministry of Finance during workshop.
[88] Survey with health authorities.

mitigate the risk of lost sales. In particular, while available at brand level, reports on advertising expenditure for individual companies does not provide granular information at country level, but rather worldwide[89]. Thus, this remains a research aspect which requires further investigation.

An additional industry response to the introduction of HFSS taxes could be seen in changed cross-border B2B flows (i.e., trade between businesses operating in neighbouring countries). Even if HFSS taxes were designed to not affect cross-border trade through price differences (which are caused by differences in tax rates between two countries), we can test whether HFSS tax affected cross-border B2B trade. Our econometric analysis shows that the observed impact of HFSS taxes on cross-border B2B purchase values or prices is not significant, for either SSBs or the category of ice cream, chocolate and other confectionery (see Annex I on Case Studies for more details).

The focus of the following section is therefore on cost pass-through and product reformulation, strategies on which considerably more quantitative evidence could be gathered.

2.2.1.1 Pass-through of HFSS taxes on prices

The existing empirical evidence from the **literature** points towards **high pass-through** of HFSS taxes. Andreyeva et al. (2022) conduct a systematic review and meta-analysis of the outcomes associated with pricing policies on SSBs in a selection of countries with SSB taxes in place including France, Denmark, Portugal, Finland, Hungary and Catalonia.[90] The authors report **an average 82% tax pass-through rate for SSB taxes**. This implies some under-shifting, i.e. a smaller part of the tax burden is not passed on to consumers but borne by producers. However, there appear to be large differences between countries. Overall, Andreyeva et al. (2022) find conclusive evidence that SSB taxes are associated with higher prices of taxed products.[91]

Literature research for **individual EU Member States suggests a slightly more varied picture.** Pass-through rates lie within a rather broad range, and under-shifting as well as over-shifting of SSB taxes can be observed. For France, several studies find that pass-through of the SSB tax ranges from 39% to 100%, depending on the type of beverage, brand and sales point. Taxes on private labels and small producers' brands are generally over-shifted while they are under-shifted for large producers' brands[92]. This is partially due to the fact that in France there are two main retailing groups with is fierce price competition between them, which can explain the low pass-through rate for big retailers

[89] These data indicate that in 2018 most brands spent 85% or more of their advertisement budget on TV advertisements. However, a breakdown per country of such data could not be found, with only expenditure on online advertisements (based on visits to websites and price rates per visit) being available per country, which, however, constitutes only a small part of total advertisement spending. Source: Sugary Drink Facts, available here.

[90] Andreyeva T, Marple K, Marinello S, Moore TE, Powell LM., (2022) Outcomes Following Taxation of Sugar-Sweetened Beverages: A Systematic Review and Meta-analysis. JAMA Netw Open. 2022 Jun 1;5(6):e2215276. doi: 10.1001/jamanetworkopen.2022.15276.

[91] Andreyeva T, Marple K, Marinello S, Moore TE, Powell LM. (2022) Outcomes Following Taxation of Sugar-Sweetened Beverages: A Systematic Review and Meta-analysis. JAMA Netw Open. 2022 Jun 1;5(6):e2215276. doi: 10.1001/jamanetworkopen.2022.15276.

[92] S. Gangl (2021), *Do soda taxes affect the consumption and health of school-aged children? Evidence from France and Hungary,* available here; RIVM (2020); Le Bodo et al. (2022).

versus smaller ones[93]. For Portugal, substantial tax pass-through to consumer prices was identified, namely almost 100% for drinks with >80g of sugar per litre, more than 100% for drinks with less sugar, and about 100% for artificially sweetened beverages (average price increases of about 16%, 19%, and 8% respectively, compared to water). The underlying over-shifting for drinks with less than 80 grams of sugar per litre was partially linked to costs associated with product reformulations[94]. For Finland, an empirical study finds a pass-through rate of more than 100%.[95]

Our estimations, starting with a simple Ordinary Least Squares (OLS) approach, point to **a pass-through of HFSS taxes of around 90% with a full pass-through well within the confidence interval**. Including year dummy variables strengthens this result with an **average price pass-through of approximately 110%**, with a proportional pass-through rate well within the confidence interval. The most parsimonious fixed effects regression also confirms the full pass-through with an **estimate of 105%**. However, once yearly fixed effects or additional control variables are included in the model it is difficult to disentangle the price changes in reaction to the tax changes from other ongoing trends.

Upon closer inspection of the four case study countries analysed in this study, our econometric analysis shows that the Belgian retail market is highly competitive, with aggressive pricing resulting in initial price decreases, although over the course of five years, **close to 70% of the SSB tax is passed on to consumers**. A **high cost pass-through** was also found in **Denmark for chocolate (72%-87%) and roughly twice the HFSS tax increase for ice cream (191%-228%)**, suggesting an over-shifting of the tax to consumers for the latter. In France, the cost pass-through estimates vary considerably depending on the data source. Based on Euromonitor brand level data, the cost pass-through of **30%** is estimated to have caused additional consumer expenses of €13.1 million in 2021 through the tax reform of 2019. Based on Kantar data, the cost pass-through for the total of soft drinks (including carbonates, energy drinks and sports drinks), ready-to-drink tea and juice drinks was much higher at **110%**. These estimates are close to those presented above derived from the literature review. Finally, in Poland, the tax appears to have been **passed on to consumers at a rate of 107%**, although it varies significantly between different taxed products.

When assessing the variations in tax pass-through across countries, it is important to bear in mind that **a multitude of factors** are at play, including consumer income, tax design and the type of products. Much depends on **market structure and actions from individual economic operators**. Insights from **stakeholder interviews point to high levels of cost pass-through**. Various industrial stakeholders consulted throughout the study, including large manufacturers, indicated they pass most of the tax burden onto

[93] WHO (2022), *Health taxes – Policy and Practice*, available here.
[94] J. Gonçalves, J. Pereira dos Santos, *Brown Sugar, how come you taste so good? The impact of a soda tax on prices and consumption*, available here.
[95] E.g. Kosonen, Savolainen (2019), *Makeisveron vaikutus makeisten hintoihin ja kulutukseen*, available here.

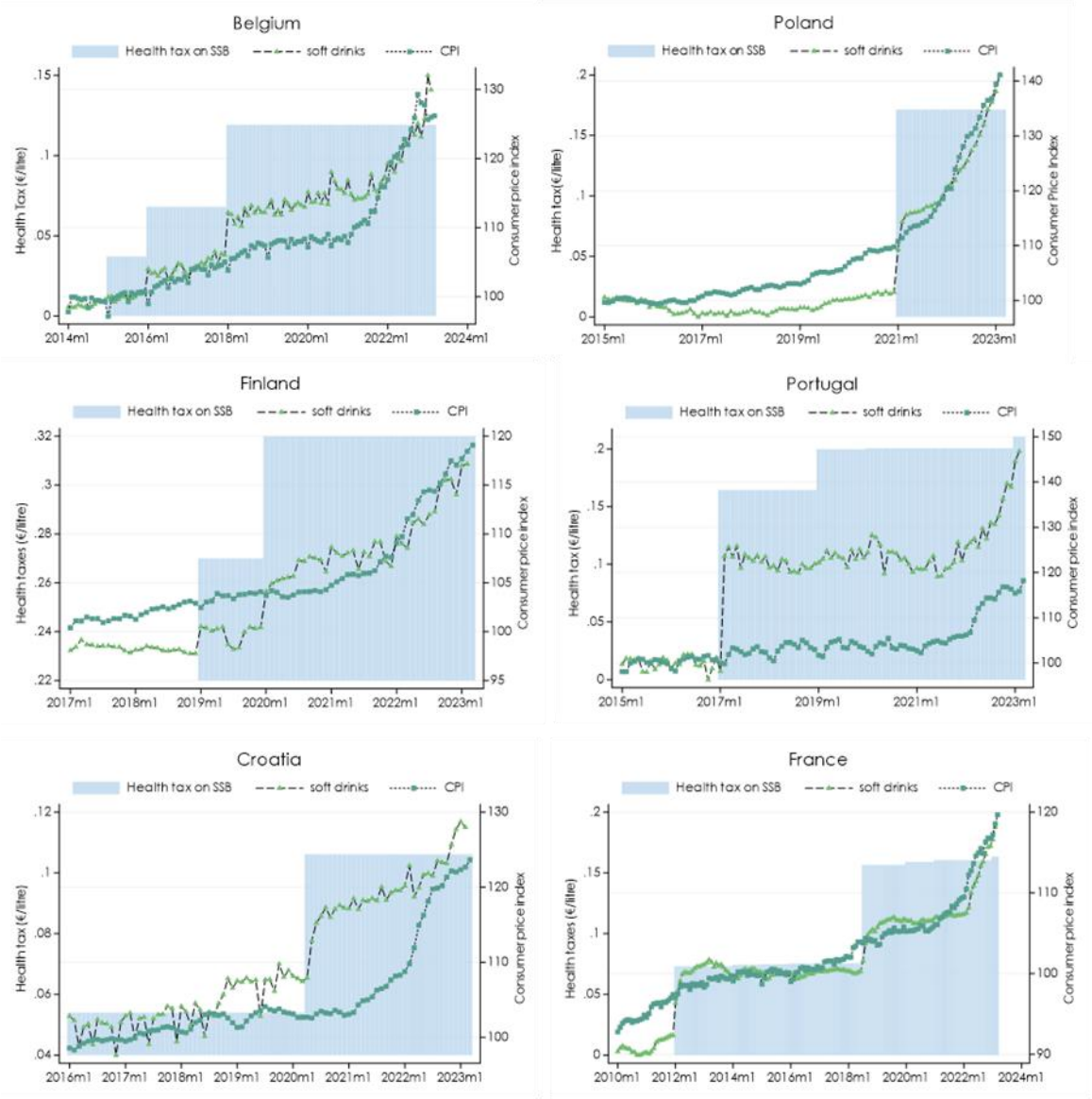
consumers, close to full pass-through (100%), with few exceptions in small communities where a fraction of the tax can be absorbed due to the competitive setting[96]. Indeed, the soft drinks market tends to be highly concentrated[97], leading to relatively higher cost pass-through. For example, the concentration ratio (CR3), i.e., the market share of the three leading companies in the carbonates market segment, lies above 80% in Ireland, France, Estonia, Sweden and Greece. Only Germany has a somewhat fragmented market with a CR3 below 50%[98].

Nevertheless, our research points to important nuances and differences underlying these patterns. For example, as can be seen in Belgium, the **competition** between retailers as well as manufacturers is of crucial importance, and this can lead to a limited or delayed pass-through, as economic operators may fear losing market shares or volumes. Indeed, the markets in which HFSS taxes may be applied vary widely, with the characteristics of those markets potentially influencing the responses of commercial actors[99].

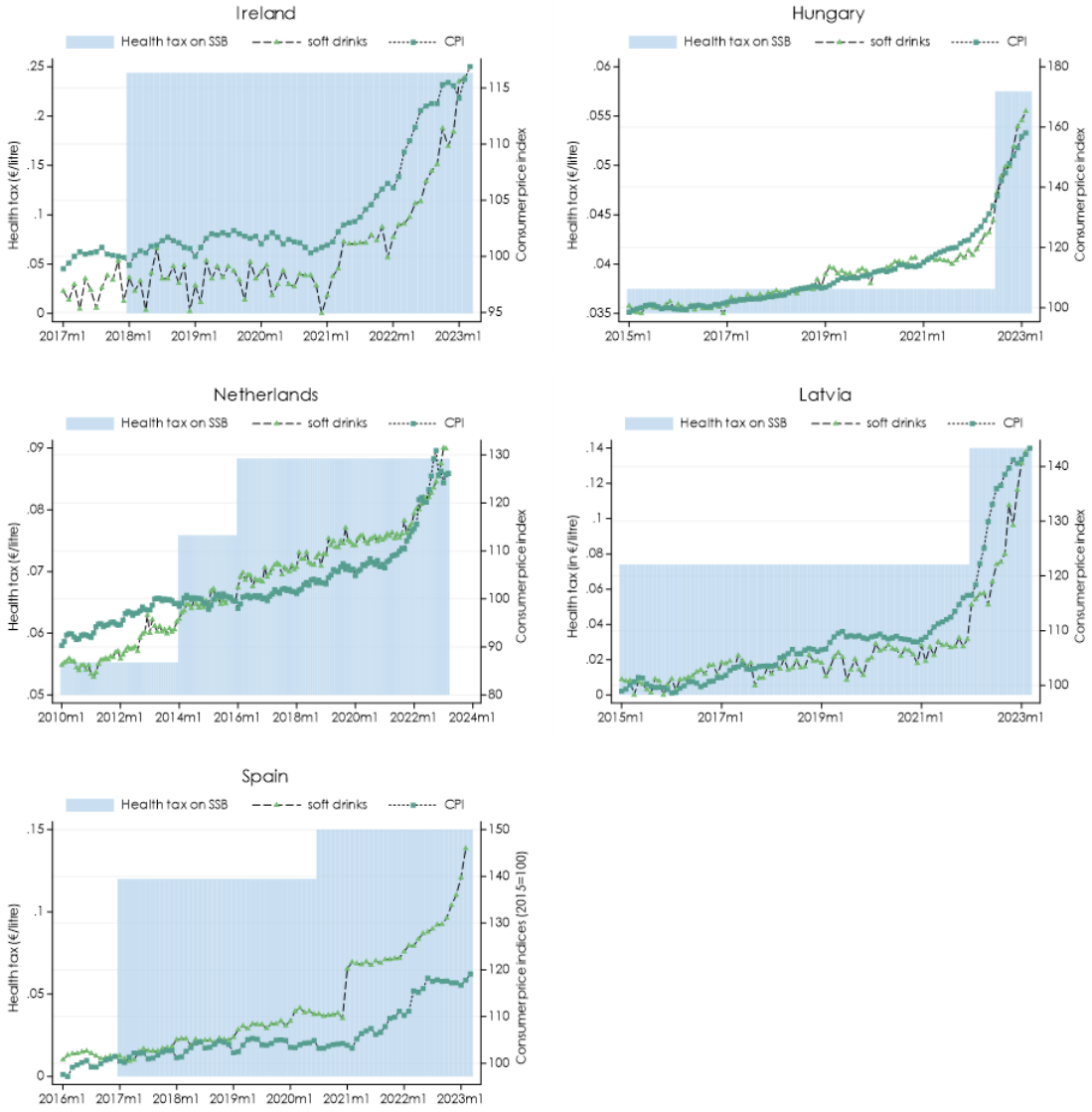
As part of their responses, manufacturers and retailers can also choose the **timing** of the cost increase, e.g. prior to, during or well after the introduction of the tax. shows that, for most countries, a clear shift of the relative price level of SSBs can be observed around the introduction or the increase of a tax on SSBs. However, for several countries, the price differences appear to become less relevant over time. In Spain, the price index for soft drinks changed at the beginning of 2021, while the tax on SSBs had already been introduced in Catalonia in 2017 (and increased in 2020). This means that the noticeable price increase is primarily driven by the reclassification of SSBs from the reduced VAT rate to the standard rate, while in contrast a SSB tax in only one region is insufficient to change the national price index.[100]

[96] Interviews with industrial stakeholders .
[97] WHO (2022), *Health taxes – Policy and Practice*, available here.
[98] Own calculations for 2022 based on Euromonitor data for 24 EU Member States.
[99] WHO (2022), *Health taxes – Policy and Practice*, available here.
100 As of 1.1.2021 sugar sweetened beverages are subject to the standard rate (21%) while they were previously taxed at 10% . See : https://ec.europa.eu/taxation_customs/tedb/taxDetails.html?id=240/1688162400#rate_structureTitle1.

Figure 8: Development of relevant price indexes across EU countries[101]



[101] The figure contrasts the consumer price indices for all goods and services (CPI) and the one for soft drinks (CP1.2.2.2) against the level of SSB taxes.



Source: Eurostat and own compilation of tax rates.

Building on the competition argument above, research shows that **pass-through tends to generally be lower in smaller jurisdictions**, where cross-border shopping is relatively easier. In these jurisdictions, there is often higher competitive pressure on firms to keep prices down, and so it is more likely that taxes will not be fully passed through to prices[102]. For instance, empirical evidence from Denmark shows that the tax pass-through for soda[103] is an increasing function of the distance to the German border.[104]

In conclusion, although clear differences exist between the jurisdictions studied, **cost pass-through of HFSS taxes tends to be strong, typically in the region of 70% and >100%**, as already shown in the literature. However,

[102] Griffith R., O'Connell M., Smith K., Stroud R. (2019), *The evidence on the effects of soft drink taxes. IFS Briefing Note BN255, The Institute for Fiscal Studies*, available here.
[103] Tax was repealed in 2014.
[104] Bergman U.M., Hansen N.L. (2019), *Are excise taxes on beverages fully passed through to prices? The Danish evidence,* available here.

much depends on the market structures and the actions of economic operators (manufacturers as well as retailers), with the pass-through varying across countries and product categories. Our own analysis confirms high pass-through rates for the case study countries, including Belgium (approximately 70%), France (30% to 110%, depending on the drink), Poland (107%) and Denmark (72% - 87% for chocolate and 291%-228% for ice cream).

In conclusion, our analysis emphasises the importance of understanding consumer behaviour and market dynamics when implementing HFSS taxes. Cost pass-through tends to be lower in highly competitive markets and where cross-border shopping may take place. Moreover, timing is crucial, and it can take several years before a HFSS tax has been fully passed on to consumers.

2.2.1.2 Effects of HFSS taxes on product reformulation

Manufacturers have other powerful strategies at their disposal, namely product reformulation and changes in the product portfolio, including both the introduction of new products and/or discontinuing existing product lines. Changes in product portfolios are difficult to capture through data analysis, especially as they cause interruptions of time series required for the analysis. The focus of this analysis is therefore on the reduction in the taxable content within existing brands, and hence a reduction in the tax liability – at least in countries which have a tiered or progressive tax scheme in place. In reality, tax schedules tiered according to the unhealthy ingredient provide financial incentives for manufacturers to reduce the concentration of sugar, fat or salt in the taxed products, e.g. in the case of SSB taxes for added sugar.

In addition to existing HFSS taxes or in the absence of such taxes (or in an attempt to discourage the introduction of such schemes), manufacturers can also take **voluntary reformulation** decisions based on sugar reduction agreements between public authorities and soft drink manufacturers. For instance, in 2018, the Dutch government agreed on a package of measures to reduce the number of children and adults who are overweight and obese in collaboration with more than seventy public and private organisations in the 'National Prevention Agreement'[105]. Several parties in the Dutch food industry signed the agreement and, in turn, are asked to voluntarily engage in initiatives such as the Dutch National Approach to Product Improvement[106], in order to make the food industry voluntarily reduce saturated fat, sugar, and added salt levels in their food products. A recent modelling study for Portugal[107] finds that co-regulation agreements with the food industry might be an effective strategy to change food environments, mitigate risk factors and improve health. However, the study concludes that voluntary agreements are insufficient on their own and need to be accompanied by interventions to improve dietary consumption patterns and population health. Similarly, a recent study[108] finds

[105] M. Eykelenboom, S.K. Djojosoeparto, M.M. van Stralen, M.R. Olthof, C.M. Renders, M.P. Poelman, C. Kamphuis, I. Steenhuis (2021), Stakeholder views on taxation of sugar-sweetened beverages and its adoption in the Netherlands, available here.
[106] RIVM (2022) here.
[107] Goiana da Silva et al. (2019), Modelling impacts of food industry co-regulation on non-communicable disease mortality, Portugal.
[108] RIVM (2020), Suikertaks: een vergelijking tussen drie Europese landen.

that, following the introduction of the UK Soft Drinks Industry Levy, the reported sugar reduction in sugary drinks was much greater than the reduction in sugar content for other products for which a voluntary sugar reduction applied (which were, however, still effective in reducing the sugar content).

The literature review undertaken in this study identifies one meta-analysis (Andreyeva et al., 2022)[109] and two comparative studies (Allais et al*,* RIVM)[110] examining the effect of HFSS taxes on manufacturers' behaviour, including the reformulation of taxed items. Andreyeva et al. (2022) report that tiered taxes are associated with beverage reformulation and reduced sugar content in taxed SSBs in the UK, South Africa, and **Portugal**.[111] Specifically, the UK evidence demonstrates that the application of the UK Soft Drinks Industry Levy (SDIL) has led to a significant reduction in the share of beverages exceeding the lower levy threshold for sugar (by 33.8%).[112] Moreover, while this analysis shows that manufacturers of branded drinks did not react to the SDIL by changing product sizes, supermarkets were found to change own-brand product sizes[113], which represents another method through which sugar intake can be reduced.

Two studies analyse the effectiveness of SSB taxes regarding manufacturers' behaviour in European markets. Allais et al. (2023) use a difference-in-differences design to compare the trends in average sugar content in SSBs launched in European markets.[114] The countries involved are **France** and the UK (where taxes are designed to encourage reformulation by applying tax schedules tiered according to sugar content), the **Netherlands** (policy based on voluntary agreements to reduce sugar enacted in 2014), and **Germany, Italy**, and **Spain** (where none of the two policies exists). The study finds that **a sugar-based tax (in the UK) is more effective in encouraging sugar reduction than a volume-based tax design** and a public health policy based on voluntary reformulation. A study conducted by the Dutch National Institute for Public Health and the Environment on the implementation of sugar-based taxes in France, Norway and the UK finds that a tiered approach in which drinks high in sugar are more heavily taxed can incentivise a reformulation process*[115]*. In particular, while respective evidence exists for the UK, no effect was detected on reformulation of SSBs in France. For the latter, however, it has to be noted that the study (published in 2020) only partially takes into account the effects

[109] Andreyeva T, Marple K, Marinello S, Moore TE, Powell LM. Outcomes Following Taxation of Sugar-Sweetened Beverages: A Systematic Review and Meta-analysis. JAMA Netw Open. 2022 Jun 1;5(6):e2215276. doi: 10.1001/jamanetworkopen.2022.15276.

[110] Allais, Olivier and Enderli, Géraldine and Sassi, Franco and Soler, Louis-Georges, Effective Policies to Promote Sugar Reduction in Soft Drinks: Lessons from a Comparison of Six European Countries. http://dx.doi.org/10.2139/ssrn.4364868; RIVM, Suikertaks: een vergelijking tussen drie Europese landen Kenmerken en effecten van een belasting op suikerhoudende dranken, met overwegingen voor Nederland 2020.

[111]Andreyeva T, Marple K, Marinello S, Moore TE, Powell LM. Outcomes Following Taxation of Sugar-Sweetened Beverages: A Systematic Review and Meta-analysis. JAMA Netw Open. 2022 Jun 1;5(6):e2215276. doi: 10.1001/jamanetworkopen.2022.15276. PMID: 35648398; PMCID: PMC9161017.

[112]Scarborough ET AL. (2020), Impact of the announcement and implementation of the UK Soft Drinks Industry Levy on sugar content, price, product size and number of available soft drinks in the UK, 2015-19: A controlled interrupted time series analysis.

[113]Scarborough ET AL. (2020), Impact of the announcement and implementation of the UK Soft Drinks Industry Levy on sugar content, price, product size and number of available soft drinks in the UK, 2015-19: A controlled interrupted time series analysis.

[114] Allais, Olivier and Enderli, Géraldine and Sassi, Franco and Soler, Louis-Georges, Effective Policies to Promote Sugar Reduction in Softby Drinks: Lessons from a Comparison of Six European Countries. http://dx.doi.org/10.2139/ssrn.4364868

[115] RIVM (2020), Suikertaks: een vergelijking tussen drie Europese landen.

of the 2018 reform when the flat rate was replaced by a progressive tax schedule tiered by sugar content.

A modelling study by Goiana-da-Silva et al. (2020) on the projected impact of SSB taxes in **Portugal** finds that the Portuguese SSB tax triggered product reformulation.[116] Product reformulation has led to a decrease in the average energy density of SSBs by 3.1 kcal/100 ml.[117]

A descriptive analysis of the sugar content in carbonated SSBs and non-carbonated SSBS in Poland by Wierzejska (2022) finds that the introduction of the SSB tax in **Poland** in January 2021 has led to a reduction in the sugar content.[118] After the introduction of the SSB tax, 70.0% of the non-carbonated SSBs and 53.4% of the carbonated SSBs, in total 62.6% of the beverages, had a changed composition in terms of sugar content and/or juice content.[119] The decrease in the sugar content was higher in the carbonated SSBs group (on average by 1.7 g/100 ml) than in the non-carbonated SSBs group (on average by 0.7 g/100 ml).[120] There was an increase in the share of beverages with ≥20% juice content, which are subject to a lower tax rate, from 46.5% to 61.1% of all beverages studied.[121] Moreover, there was nearly a triple increase in the share of beverages studied that were fully tax-exempt (beverages containing ≥20% juice and ≤5 g of sugar/100 ml). In contrast, an earlier study carried out by Bilek et al. (2014) on the juice market in Poland before the introduction of the tax found that juices were contained in just five out of 17 fruit flavoured beverages (29%) and their corresponding amounts were only symbolic (0.1–3.0% juice). The remaining beverages used only flavourings.[122] Anecdotal evidence from some competent authorities consulted also indicated some reformulation as a consequence of the introduction of HFSS taxes (e.g. Poland or Latvia).[123]

Our own analysis shows that the sugar content tends to be lower in countries with higher tax rates for regular soft drinks (as opposed to low-sugar soft drinks), but even for those soft drinks **the correlation between sugar content rate and the tax rate is statistically insignificant**. The highest variation in sugar content between countries was observed for a market leading orangeade. In seven countries with a tax on soft drinks (Finland, France, Hungary, the Netherlands, Portugal, Poland and the UK), the sugar content is relatively low compared to countries without a tax on soft drinks, and in four countries (Belgium, Croatia, Ireland and Latvia) the sugar content is relatively

[116] Goiana-da-Silva F, Severo M, Cruz E Silva D, Gregório MJ, Allen LN, Muc M, Morais Nunes A, Torres D, Miraldo M, Ashrafian H, Rito A, Wickramasinghe K, Breda J, Darzi A, Araújo F, Lopes C. Projected impact of the Portuguese sugar-sweetened beverage tax on obesity incidence across different age groups: A modelling study. PLoS Med. 2020 Mar 12;17(3):e1003036. doi: 10.1371/journal.pmed.1003036. PMID: 32163412; PMCID: PMC7067376.
[117] Ibid.
[118] Wierzejska RE (2022). The Impact of the Sweetened Beverages Tax on Their Reformulation in Poland-The Analysis of the Composition of Commercially Available Beverages before and after the Introduction of the Tax (2020 vs. 2021). Int J Environ Res Public Health. Nov 4;19(21):14464. doi: 10.3390/ijerph192114464. PMID: 36361345; PMCID: PMC9658175.
[119] Ibid.
[120] Ibid.
[121] Ibid.
[122] Bilek M., Stawarczyk K., Pasternakiewicz A. Content of glucose, fructose and sucrose in selected soft drinks. Probl. Hig. Epidemiol. 2014;95:438–444.
[123] Representatives from Finance Ministry during workshop.

high. When running a regression with an intercept, an increase of the tax rate by one cent per litre correlates with a statistically insignificant decrease of the sugar content by 0.032 grams per 100ml.

Although the sugar content rate of regular soft drinks does not correlate with the tax rate, product reformulation in the form of introducing low-sugar soft drinks was observed when Poland introduced its SSB tax in 2021. These were low-sugar drinks that were already sold in other Member States, but not in Poland before 2021. Hence there is anecdotal evidence that **a HFSS tax may trigger the introduction of low-sugar soft drinks in countries where they are not already available**.

The variation in responses from industry representatives through the survey confirms that **effects of HFSS taxes on product reformulations vary by brand and Member State**. Specifically, 40% indicated that they made changes to the composition of the HFSS product affected by the tax (e.g. reduction of sugar content), while 25% indicated no product reformulation (35% did not know or specify).

When it comes to product reformulation, a methodological challenge lies in the attribution of any such changes in the sugar content to the SSB tax. As stated above, HFSS taxes may encourage product reformulation, as well as a shift in demand towards less sugary drinks due to health reasons or due to a change in tastes. One possible reason is consumer health awareness. For example, in the Netherlands sales of soft drinks and juices/nectars have declined between 2011 and 2020 while the sale of bottled water has increased.[124] In addition, the calorie content of purchased soft drinks has decreased by 27% between 2012 and 2020,[125] despite an absence of changes in the tax rate of non-alcoholic beverages. However, this may also be caused by a switch to lower-calorie soft drinks: the share of reduced-sugar carbonates in the total share of carbonates sold (in litres) increased from 20% in 2012 to 30% in 2018 and 41% in 2020 according to Euromonitor data.

Another approach used to assess the relationship between SSB taxes and sugar content is to relate changes in the sugar content rate to changes in SSB tax rates. It is possible to look up current sugar content rates on product labels online from various sources (manufacturers and supermarkets). For historical data on sugar content at the product level, only one source was identified, a study from 2015.[126] Using this source and data on current sugar content rates, our finding is that the sugar content has remained stable for regular cola from a market leading cola brand – a product with a firmly defined recipe. Nevertheless, this brand appears to have a strategy to launch new variants, including low or zero sugar versions.

However, the same company, for a market leading brand of orangeades, reduced the sugar content by 16% to 17% both in countries with an SSB tax and without such taxes. Another major cola brand reduced the sugar content in

[124] See https://www.fws.nl/sector/cijfers/.
[125] See https://www.fws.nl/gezonde-levensstijl/preventieakkoord/calorieredu ctie/.
[126] See https://www.actiononsugar.org/media/actiononsugar/news-centre/surveys-/2015/International-Drinks-Data.pdf.

both countries with and without an SSB tax, but more so in countries with an SSB tax (by 36%) than without such a tax (by 25%). Thus, product reformulation can only be partially attributed to SSB taxes even when the sugar content is reduced.

By looking at case study countries in more detail, own analysis shows that the **Belgian** SSB tax appears not to have incentivised specific product reformulation. Limited reductions of sugar intake through soft drinks are noted. These limited reductions can be linked to the flat and relatively low SSB tax, which has not incentivised the industry to specifically reduce the sugar content of soft drinks in Belgium.

For **Denmark**, no historical data on sugar content levels was found. However, certain ice cream and confectionery brands have introduced variants with artificial sweeteners instead of sugar, proving that products have been reformulated, but the causal link with SSB taxes seems weak.

France is one of the countries where a market leading brand of orangeades reduced the sugar content, from 9.7 g per 100 ml in 2015[127] to 6.5 g per 100 ml in 2023. However, there is no statistically significant correlation with the tax rate: every additional cent of tax per litre is estimated to reduce the sugar content by 0.03 g per 100 ml with an error margin of 0.1 g per 100 ml (twice the standard error). A market leading cola brand also reduced the sugar content in France, from 10.9 g per 100 ml in 2015 (same for all countries) to 7 g per 100 ml in 2023, but again there is no statistically significant correlation with the tax rate: a reduction of 0.06 g per 100 ml with also an error margin of 0.1 g per 100 ml. While two brands reduced the sugar content, although not necessarily in response to SSB taxes, another market leading cola brand kept the sugar content of its regular cola product at 10.6 g per 100 ml. For a lemonade, another product produced by the same company, the sugar content even increased from 6.7 g per 100 ml in 2015[128] to 8 g per 100 ml in 2023.[129]

For **Poland,** various sources point towards a significant drop in the market share of beverages containing >5 g of sugars/100 ml following the introduction of the tax, which led to a clear reduction in sugar content. Evidence also shows that there was an increase in the proportion of beverages with ≥20% juice subject to a lower tax rate. Our own analysis of some major 'global' brands' product composition did not indicate such major reductions in the sugar content. Nevertheless, it seems clear that the tax has triggered the introduction of new reformulated products that were already sold elsewhere in the EU (e.g. zero sugar drinks)[130]. We expect stronger product reformulation efforts to have taken place amongst local brands.

In conclusion, evidence exists showing that **product reformulation can be a powerful tool for manufacturers to adapt to the introduction of HFSS**

[127] See https://www.actiononsugar.org/media/actiononsugar/news-centre/surveys-/2015/International-Drinks-Data.pdf.
[128] Ibid.
[129] See https://www.carrefour.fr/p/soda-arome-citron-citron-vert-sprite-5449000286284.
[130] For more details, please see Case studies Annex.

taxes, as shown in existing literature and confirmed by various stakeholders consulted. In countries with tiered or progressive SSB taxes, a reduction of the sugar content in their beverages may allow for the cushioning of the SSB tax impact and can help to retain or increase market shares. Our research points to an effective **reduction of sugar content in countries with pronounced tiered/progressive tax schemes**, notably Poland and Portugal, but less so in France. Amongst case study countries, some reformulation was noticed in Denmark and Belgium, although the causal link with HFSS taxes is not clearcut due to existing market trends (i.e., growing consumer demand for reduced sugar products). Such product reformulation lies entirely in the hands of manufacturers, and much depends on the brands' characteristics (recipe) and their local specificity. There is no proof of spill-over effects, in the form of such product reformulation being extended beyond the jurisdiction which has imposed the tax.

2.2.2. Demand side effects of HFSS taxes

Following the rationale of HFSS taxes, we have established what taxes are imposed by competent authorities, and what possible reactions are then triggered on the side of economic operators. While working towards attaining the ultimate health objectives of HFSS taxes, the next step is to determine consumers' reaction to such taxes. A crucial element is the price elasticity, i.e. the extent to which the introduction of the tax and the ensuing cost pass-through results in a fall in demand. The price elasticity will then help to establish the actual volumes of taxed products being consumed and whether product substitution takes place. The chapter then presents evidence of the effects of HFSS taxes on affordability and cross-border shopping phenomena.

2.2.2.1. Price elasticity of demand

The price elasticity of demand measures the percentage change in volumes bought in response to a percentage change in the price. The own-price elasticity measures the change in demand in response to a change in the price of the product in question and is generally negative: an increase in the price results in reduced consumption. The cross-price elasticity measures the change in volume in response to a price change of another product and is generally positive for substitute products: an increase in the price of a competing (substitute) product increases the consumption of the product in question.

The own-price elasticities of demand for SSBs are generally estimated to be within a range of between approximately -0.8 (especially for high-income countries) and -1.3 (for low- and medium-income countries), with a mean of approximately 1.0.[131] According to a recent systematic review of meta-analyses by Andreyeva et al. (2022)[132] based on 33 studies on 16 tax policies, the **demand for SSBs tends to be even more sensitive to tax-induced price increases, at −1.59**. The studies included were evaluations of SSB taxes in

[131] WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets.

[132] T. Andreyeva, K. Marple, S. Marinello, T.E. Moore, L.M. Powell, *Outcomes Following Taxation of Sugar-Sweetened Beverages A Systematic Review and Meta-analysis* JAMA Netw Open. 2022 Jun 1;5(6):e2215276. doi: 10.1001/jamanetworkopen.2022.15276. PMID: 35648398; PMCID: PMC9161017.

five EU Member States (Denmark, Finland, France, Hungary and Portugal), three OECD countries (Chile, Mexico and the UK), plus two other locations (Barbados and Saudi Arabia). In addition, evaluations of local or regional SSB taxes in Spain (Catalonia) and five States in the USA (Philadelphia, California, Illinois, Washington and Colorado)[133] were included for comparison and analysis. On the whole, Andreyeva et al. (2022) find conclusive evidence that SSB taxes are associated with higher prices of taxed items and lower sales, suggesting that consumers respond to fiscal measures.[134]

A systematic review and meta-analysis by Afsin et al. (2017) examines the impact of price changes on diet in interventional and prospective observational studies largely based on specific settings (e.g., hospitals).[135] The review included RCTs, non-randomised interventions and prospective cohort studies from France, the Netherlands, South Africa and the United States of America. The authors report a pooled price elasticity of −0.67 (95% CI: −0.31 to −1.04), i.e., a 7% decrease in consumption for a 10% increase in price.[136] Escobar et al. (2013)[137] is based on a meta-analysis and examines the impact of SSB taxes and price changes (e.g., in tax simulation modelling) on SSB consumption reporting a combined price elasticity of −1.30 (95% CI: −1.09 to −1.51).

Among EU countries, empirical studies estimate the price elasticity of demand for SSBs **for Poland** at –1.318[138] and at -0.99 for **France**[139]. From an industry perspective, a large producer consulted during our study indicated slightly lower elasticity estimates for the EU market, around 0.8 for the future consumption (FC) market, while indicating a rather inelastic demand for immediate consumption (e.g. at a bar or at a café)[140].

Our own **econometric analysis** for **Belgium** based on brand-level Euromonitor data finds a limited price elasticity: at the current tax level, a 1% price hike results in a decrease of consumption by 0.37%. In contrast, at the more aggregate level, the price elasticity of –1.26 estimated with Eurostat HBS data takes account of differences in household income and is more in line with the existing literature, thus indicating the importance of accounting for household income when estimating price elasticities. This approach infers the prices from the reported quantities and expenditures and identifies the price elasticities by regressing consumption shares on prices.[141] The point estimate for the own-

[133]Specifically, these studies were focussed on the following locations: Philadelphia, Pennsylvania; Berkeley, California; Oakland, California; Cook County, Illinois; Seattle, Washington; San Francisco, California; Boulder, Colorado. Ibid.
[134] Ibid.
[135]Afshin A, Peñalvo JL, Del Gobbo L, Silva J, Michaelson M, et al. (2017) The prospective impact of food pricing on improving dietary consumption: A systematic review and meta-analysis. PLOS ONE 12(3): e0172277. https://doi.org/10.1371/journal.pone.0172277.
[136]Afshin A, Peñalvo JL, Gobbo LD, et al. The prospective impact of food pricing on improving dietary consumption: a systematic review and meta-analysis. *PLoS ONE*. 2017;12(3):e0172277. 10.1371/journal.pone.0172277.
[137]Escobar MAC, Veerman JL, Tollman SM, Bertram MY, Hofman KJ. Evidence that a tax on sugar sweetened beverages reduces the obesity rate: a meta-analysis. *BMC Public Health*. 2013;13:1072.
[138] J. Wolak (2012), How will the introduction of the sugar tax affect the consumption habits of households in Poland?. Available here.
[139] S. Capacci, O. Allais, C. Bonnet, M. Mazzocchi (2019), The impact of the French soda tax on prices and purchases. An ex post evaluation.
[140] Interview with representative from industry stakeholder.
[141] See An Almost Ideal Demand System, Angus Deaton, John Muellbauer, The American Economic Review, Vol. 70, No. 3. (Jun., 1980), pp. 312–326 for more detail.

price elasticities of -1.26 indicates that the demand for soft drinks is relatively elastic in Belgium.

In **Denmark**, without accounting for income changes, our own econometric analysis estimates the price elasticity of taxed products at -0.60, and if it were possible to account for income changes, the price elasticity is estimated to be between -1.2 and -1.8[142]. For **Poland**, the price elasticity of soft drinks is estimated at -1.35 using HBS data. For **France**, it was not possible to account for income changes either, and the estimated price elasticities for regular SSBs (as opposed to reduced-sugar drinks) vary between -0.4 and -0.6 and are statistically significant (i.e. with almost certainty smaller than 0). However, these estimates are biased due to a lack of data on individual household incomes. Given the similarity of Euromonitor estimates for France, Belgium and Poland, and the similarity of HBS estimates for Belgium and Poland, we estimate that the price elasticity of regular SSBs is actually close to -1 in France.

We observe a somewhat lower price elasticity than the international literature. This may be due to the fact that income in EU countries is higher than in most parts of Asia or Latin America, where consumption is more sensitive to prices. Even within the EU the price elasticities differ, with an average -1.22 for SSBs in higher-income EU countries and an average -1.40 in lower-income EU countries. Based on 2015 Eurostat Household Budget Survey data, SSB price elasticities are even about -1.5 in Cyprus and Malta despite relatively high incomes, but prices of SSBs are on average also higher in those small island countries. There is no correlation between the tax rate and the own-price elasticity of SSBs. For tax rates at 11 gr sugar per 100ml, the price elasticities are -1.35, -1.39, -1.29 and -1.25 for countries with a tax rate at 0, in the bracket 1-9 cents per litre, 10-19 cents per litre and 20+ cents per litre, respectively. The absence of a clear pattern and the fact that low-income countries have lower tax rates indicate that any differences in price elasticities should be attributed to the differences in income level rather than the existence of a HFSS tax or the HFSS tax rate.

In conclusion, **the demand for HFSS products is relatively elastic**. Our analyses point to a strong variation of price elasticity amongst EU Member States studied, depending on the extent of the price increase. We estimate price elasticities to be between -1 and -1.8 for the case study countries; specifically, where Belgium (-1.2), Poland (-1.35), France (-1) and Denmark (between -1.2 and -1.8) are concerned. In addition, our own econometric analysis implies the importance of accounting for income changes because an increase in income masks a more negative price effect: estimates with and without income data differ by factor two.

[142] For more details, see case studies annex.

2.2.2.2. Changes in consumption

As the evidence presented in the preceding section indicates, purchases of SSBs are sensitive to changes in prices and a HFSS tax that leads to price increases can be expected to result in changes in purchasing behaviour. However, there is **varied evidence on the effectiveness of HFSS taxes in reducing consumption**.

A cross-sectional survey of adolescent school-aged children by Chatelan et al. (2022) examines and compares changes in the shares of daily, weekly and occasional consumers of sugar-sweetened soda in six European countries (**Belgium, Finland, France, Hungary, Latvia** and **Portugal**) that introduced/updated an SSB tax between 2001-2002 and 2017-2018.[143] The study compares each of these six countries with a similar European country; these are the Netherlands, Sweden, Germany, Italy, Poland, Lithuania, and Spain. It shows that in **Belgium** the prevalence of daily soda consumption decreased from 35.1% to 27.8% between 2013 and 2018; while occasional soda consumption remained constant in this period[144], suggesting the tax has a relatively larger impact on daily consumers. In comparison, the prevalence of daily soda consumption was reduced following SSB tax implementation in **Latvia** (from 17.9 to 11.9%), **Finland** (4.2 to 2.5%), and **Portugal** (17.4 to 14.9%), to a limited extent in France (29.4 to 28.2%) but not in **Hungary** (29.8 to 31.3%).[145] However, Chatelan et al. (2022) note that the reductions were similar (**Finland)** or smaller (**Belgium** and **Portugal**) than those in the comparison countries, except in **Latvia** where the reduction was larger. Meanwhile, the prevalence of weekly soda consumption remained stable in **Finland**, **Hungary** and **France** or increased in **Latvia**; while only **Portugal** experienced a decline.[146] Finally, the prevalence of occasional soda consumption (<1x/week) did not rise after implementation of the SSB tax in **Latvia**, **Finland**, **Hungary, France** and **Belgium**.[147]

For **Hungary,** the WHO notes that four years after the introduction of the HFSS tax, reduced SSB consumption was mostly sustained or further intensified.[148] More specifically, Bíró (2015) finds that the tax has induced Hungarians to eat healthier.[149] Our survey with the National Tax Authority confirms the tax has increased the appeal of healthy foods and drinks compared to unhealthy ones.[150] The tax has led to a decrease in the consumption of salty snacks[151] and a reduction in the consumption of processed food.[152]

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[143] Chatelan, A. et al. (2022) "Sixteen-year trends in adolescent consumption of sugar-sweetened soda in six European countries with a soda tax and comparison countries: A repeated cross-sectional survey analysis," Public Health Nutrition, 26(3), pp. 519–530. Available at: https://doi.org/10.1017/s1368980022002361.
[144] Ibid…
[145] Ibid.
[146] Ibid.
[147] Ibid.
[148] WHO Regional Office for Europe (2015).
[149] Bíró, A. (2015) "Did the junk food tax make the Hungarians eat healthier?," *Food Policy*, 54, pp. 107–115. Available at: https://doi.org/10.1016/j.foodpol.2015.05.003.
[150] Hungarian Ministry of Health (2019).
[151] Cornelsen & Cariedo (2015).
[152] Bíró, A. (2015) "Did the junk food tax make the Hungarians eat healthier?," *Food Policy*, 54, pp. 107–115. Available at: https://doi.org/10.1016/j.foodpol.2015.05.003.

Only small changes have been observed in consumer behaviour in countries where the tax rate is very small. For instance, competent authorities **in Belgium** (tax and health authorities) did not observe sizeable impacts on prices and changes in consumer behaviour following the introduction of the tax[153]. They considered the tax rate too small to register or bring about a substantial change in consumer behaviour; which is a main and often-cited point of criticism with the SSB tax scheme in Belgium. Our own analysis of Euromonitor data indicates that in Belgium, prices of SSBs even decreased on average initially when the SSB tax was introduced, and increased again where market shares did not decline.

Various studies also point to the modest effects of the **2012 SSB tax** in **France** in reducing consumption of SSBs. Gangl (2021)[154] compares the effect of SSB taxes in France and Hungary on consumption behaviour and the health of school-aged children. In France, the effect of the SSB tax on consumption is found to be negative but insignificant; which might be due to the low tax rate[155]. A 2020 study conducted by the Dutch RIVM (National Institute for Public Health and the Environment) shows that in **France** total sales decreased by 1.4 ml per person per day due to the 2012 soda tax; this is approximately 0.5 litres per person per year.[156] According to this study, the changes are more visible (albeit also small) among heavy consumers, where the tax-induced price increase led to a consumption reduction of 6.8 to 11.4 litres per person per year.

Capacci et al. (2018)[157] estimate the price and consumption effects of the 2012 French tax on sweetened non-alcoholic drinks using a difference-in-difference approach. The evidence on purchase responses is varied and less robust, indicating at most a very small reduction in soft drink purchases (about half a litre per capita per year), an impact which would be consistent with the low tax rate. The study finds suggestive evidence of a larger response by the sub-sample of heavy purchasers, thereby confirming the results of the RIVM (2020) study.

Following the revision of the **French** SSB tax in 2018, positive effects on consumption were detected on the French SSB market.[158] Our econometric analysis shows that while the increase in the volume of reduced-sugar soft drinks was significant from the year of the tax overhaul (2019-2021), the substitution rate with regular soft drinks was not. This suggests that the 2019 tax overhaul led to increased retail sales of reduced-sugar soft drinks but did not significantly affect sales of regular soft drinks. Overall, the consumption of reduced-sugar soft drinks started to increase from 2019 by 20 (Kantar data) to 25 (Euromonitor data) million litres per year, while the decrease in consumption of regular soft drinks continued at a similar rate per year (-45 million litres per year in 2014-2018 and -38 million litres per year in 2019-2021). Therefore, it

[153] Via interviews and stakeholders survey.
[154] S. Gangl (2021), *Do soda taxes affect the consumption and health of school-aged children? Evidence from France and Hungary,* available here.
[155] Tax rate before the 2018 reform.
[156] RIVM (2020), Suikertaks: een vergelijking tussen drie Europese landen.
[157] S. Capacci, O. Allais, C. Bonnet, M. Mazzocchi (2019).
[158] K. Lauber, H. Rippin, K. Wickramasinghe, A.B. Gilmore (2022).

is important to point out that such reductions cannot be attributed to the SSB tax alone, as there has been (since 2015 at least) a more autonomous trend toward reduced sugar-based soda consumption. Notably, over recent years, France implemented various nutrition policies such as the ban on food and beverage vending machines in schools, compulsory health messages on food advertisements and improved food labelling through the Nutri-Score[159].

For **Poland** (where the SSB tax was introduced in 2021), no data is available regarding its long-term impact on consumer behaviour due to the relatively short period of time during which the tax has been in operation.[160] Our econometric analysis shows that the introduction of the SSB tax in 2021 is associated with a striking change in sold volumes of regular soft drinks. While before 2021 the sold volume fluctuated from year to year with changes ranging from -100 to +100 million litres, in 2021 the sold volume of regular soft drinks decreased by more than 300 million litres. A similarly marked decline was observed for nectars – mostly juices with added sugars, of which the sold volume dropped by 28.6 million litres in 2021. The volumes of reduced-sugar soft drinks and 100% juices sold increased, but not more so than in earlier years. While the general drop in volumes purchased in 2021 may arguably have also been caused by COVID-related measures, the (slight) increases in the consumption of reduced-sugar soft drinks and juice drinks in 2021 appear even more remarkable.

In **Denmark**, tax rates for ice cream are substantially lower than the HFSS tax rates for chocolate and confectionery. If the HFSS tax influences consumption, a shift from other product subcategories to ice cream may be expected. Our own data analysis shows a switch from high-sugar processed foods but also surprisingly a switch from ice creams to low-sugar processed foods from 2010 to 2015, which covers the period where there were two major tax increases in 2010 and 2012 and a minor increase in 2015. From 2010 to 2015, the volumes of high sugar processed foods decreased by 1.7 million kg per year, and those of ice cream by 0.7 million kg per year. The volumes of low sugar processed foods sold increased by 0.5 million kg per year in the same period. However, from 2016 the average increase per year offset the average decrease in the preceding years for ice cream and high-sugar processed foods, and the consumption of low-sugar processed foods continued to increase at the same rate. The econometric analysis confirms that the volumes of ice cream and high sugar processed foods sold both move in the same direction and that no direct influence of the HFSS tax on the substitution between these products is noticeable.

A modelling study by Goiana-da-Silva et al. (2020) identifying the projected impact of SSB taxes in **Portugal** finds that the Portuguese SSB tax triggered a

[159] Y. Le Bodo, F. Etilé, C. Julia, M. Friant-Perrot, E. Breton, S. Lecocq, C. Boizot-Szantai, C. Bergeran, F. Jabot, *Public health lessons from the French 2012 soda tax and insights on the modifications enacted in 2018,* available here.

[160] Wierzejska RE. The Impact of the Sweetened Beverages Tax on Their Reformulation in Poland-The Analysis of the Composition of Commercially Available Beverages before and after the Introduction of the Tax (2020 vs. 2021). Int J Environ Res Public Health. 2022 Nov 4;19(21):14464. doi: 10.3390/ijerph192114464. PMID: 36361345; PMCID: PMC9658175.

reduction in demand.[161] The imposition of the SSB tax led to a reduction of 6.6 million litres of SSBs sold per year.[162] Another study finds that after the implementation of the SSB tax in Portugal in 2017, sales reduced by 7%[163], although some other studies suggest that the main benefits of the soda tax occurred in terms of reducing sugar intake through product reformulations[164]. In **Latvia**, daily consumption of soda decreased by 33.6% from 2001 to 2006 but not between 2013 and 2018, with the occasional soda consumption remaining steady during these time periods.[165]

In **Catalonia (Spain),** the share of SSBs in the total purchase volume of beverages decreased from 27.9% before the tax to 21.6% after the tax, a relative drop of 22.6%, whereas in the rest of Spain the SSB share decreased from 22.4% to 19.4%, a reduction of 13.4%. Moreover, the effects of the tax increased over time, with SSB purchases decreasing by 10.4% in the first year, 12.3% in two years, 15.3% in three years, and 16.7% in the three and a half years after the introduction of the tax[166].

Besides the level of tax rates, other important features of the tax design play an important role in affecting consumers' choices. As reported by the WHO, **specific excise taxes based on nutrient content** (e.g. sugar content) are **likely to have larger impacts on consumption**, as they encourage consumers to switch to healthier untaxed substitutes.[167] However, this is generally not the approach in EU countries, where juices and sugar-sweetened milk drinks are often exempt from the SSB tax because they also contain healthy nutrients. Hungary is the only EU country that taxes nutrient content of all products, but tax rates are relatively low (except for energy drinks). Hence, this is rather uncharted territory in the EU and there is no available evidence from EU countries to substantiate the WHO's finding.

Finally, while there is varied evidence on the effectiveness of existing HFSS taxes on changing consumption patterns, there seems to be a **consensus among various stakeholders consulted throughout the study on the need for governments to consider a broader range of policies** in order to reach their health objectives, including, for instance, raising awareness and educating people, restrictions on point of sales or marketing, or in specific places such as schools, reducing VAT on healthier food options, etc. In fact, while HFSS taxes may induce people to eat more healthily, by increasing relative prices of

[161] Goiana-da-Silva F, Severo M, Cruz E Silva D, Gregório MJ, Allen LN, Muc M, Morais Nunes A, Torres D, Miraldo M, Ashrafian H, Rito A, Wickramasinghe K, Breda J, Darzi A, Araújo F, Lopes C. Projected impact of the Portuguese sugar-sweetened beverage tax on obesity incidence across different age groups: A modelling study. PLoS Med. 2020 Mar 12;17(3):e1003036. doi: 10.1371/journal.pmed.1003036. PMID: 32163412; PMCID: PMC7067376.

[162] Ibid.

[163] Goiana-da-Silva F., Cruz ESD, Gregório MJ, Miraldo M, Darzi A, et al. (2018), *The future of the sweetened beverages tax in Portugal*. Available here.

[164] J. Gonçalves, J. Pereira dos Santos, *Brown Sugar, how come you taste so good? The impact of a soda tax on prices and consumption*, available here.

[165] Chatelan, A. et al. (2022) "Sixteen-year trends in adolescent consumption of sugar-sweetened soda in six European countries with a soda tax and comparison countries: A repeated cross-sectional survey analysis," Public Health Nutrition, 26(3), pp. 519–530. Available at: https://doi.org/10.1017/s1368980022002361.

[166] Royo-Bordonada, M. Á., Fernández-Escobar, C., Gil-Bellosta, C. J., & Ordaz, E. (2022). Effect of excise tax on sugar-sweetened beverages in Catalonia, Spain, three and a half years after its introduction. International Journal of Behavioral Nutrition and Physical Activity, 19(1), 1-11.

[167] WHO (2022), *Fiscal policies to promote healthy diets: policy brief,* available here.

unhealthy food and incentivising industry to reformulate their products, unhealthy choices are driven also by cultural aspects and the wider food environment. Therefore, it is important to consistently view HFSS taxes as part of a broader policy framework to target the consumption of unhealthy products.

In conclusion, measuring the impact of HFSS taxes on consumption behaviour is far from straightforward, as many variables are at play. However, the negative own-price elasticities imply that as long as taxes are passed through to consumers, as is on average the case in all four case study countries (either immediately or within two to three years), **a higher tax rate reduces consumption proportionally.** Such effects do not necessarily materialise overnight but require a longer time span.

2.2.2.3. Product substitution

Reduced consumption of taxed unhealthy products is a very important and observable indicator for the effectiveness of HFSS taxes. However, this aspect should be addressed in conjunction with potential product substitution. HFSS taxes can be expected to increase prices (depending on pass-through rates) and decrease the consumption of taxed products (depending on the price elasticity of demand). However, for the tax to deliver on its health objectives, it is vital to monitor how this reduced consumption of taxed products is compensated, notably whether there is substitution in favour of healthier products. Jysma et al. (2014) find that the 2014 tax increase for SSBs in **Finland** reduced the consumption of sugary soda, which resulted in an increased consumption of sugar-free soda, which indicates a tax-induced substitution effect.[168] Also in other studies for Finland, a decrease of SSB consumption is observed.[169] Substitution effects in favour of non-sugar-sweetened beverages (NSSBs) were also observed in **Catalonia** following the introduction of the tax. NSSBs were purchased and consumed more, with purchase rates increasing from 20% of the total volume of non-alcoholic beverages purchased before the introduction of the tax to 25% of the total volume following the introduction of the tax. This increase of 25% accounted for the Catalonia region whereas for the rest of Spain, the increase was only 12.4% (purchases went up from 23.4% to 26.3%).[170]

In **Finland**, following the extension of the tax to certain HFSS products (repealed in 2017), the consumption of confectionery and ice cream declined but increased consumption was observed for substitute products (i.e. frozen desserts, frozen baked goods, breakfast bars, sable desserts, dairy-based desserts and yoghurts).[171] Substitution is also observed anecdotally in other countries, as reported in interviews conducted with competent authorities. For instance, in **Portugal** a greater share of the market has started to consume sweetened instead of sugared beverages[172]. In **Hungary**, most consumers

[168] S. Jysmä, T. Kosonen, R. Savolainen (2019), *A case for zero effect of sin taxes on consumption? Evidence from a sweets tax Reform*, available here.
[169] E.g. Kosonen, Savolainen (2019), *Makeisveron vaikutus makeisten hintoihin ja kulutukseen*, available here.
[170] Royo-Bordonada, M. Á., Fernández-Escobar, C., Gil-Bellosta, C. J., & Ordaz, E. (2022).
[171] Ecorys (2014), Food taxes and their impact on competitiveness in the agri-food sector.
[172] Stakeholder survey with Portuguese Tax and Customs authority.

substitute energy drinks and sugar-sweetened soft drinks for other drinks such as mineral water, coffee and tea.[173] There was also a shift towards non-branded products.[174]

For **Belgium**, our econometric analysis suggests that regular soft drinks have been substituted through reduced-sugar soft drinks.[175] On average, the volume of regular soft drinks dropped by 2.5 million litres per year, as opposed to an average increase of reduced-sugar soft drinks by 9.6 million litres per year. In fact, the increase in litres of reduced-sugar soft drinks sold is almost equal to the combined decrease of regular soft drinks, nectars and juices (100% and juice drinks). However, when the examination of product substitution is limited to the years of the introduction or increase of the tax, the substitution of other drinks for reduced-sugar soft drinks is less prominent. Moreover, own econometric analysis indicates that the substitution of regular soft drinks for reduced-sugar soft drinks seems to be more determined by an autonomous trend than by the SSB tax.

For **Denmark,** our analysis shows for the years 2010 to 2015 a substitution from high-sugar HFSS taxed products such as chocolate (50 grams sugar per 100 gram final product), cakes (40), sugar confectionery (53) and fruit snacks (44) to lower-sugar HFSS taxed products such as pastries (21), snack bars (20) and sweet biscuits (25). In addition, ice creams were substituted for lower-sugar products despite ice creams having a sugar content rate of 21 grams per 100 ml on average. From 2010 to 2015, the volumes of these high sugar products decreased by 1.7 million kg per year, and those of ice cream by 0.7 million kg per year. The volumes sold of the above lower sugar products increased by 0.5 million kg per year in the same period. However, from 2016 the average increase per year offsets the average decrease in the preceding years for ice cream and the above high-sugar products, and the consumption of low-sugar processed foods continued to increase at the same rate. Hence, the impact of the tax increases from 2010 to 2015 may have been temporary.

For **France**, available evidence suggests that consumers substituted sugared and non-sugar sweetened soft drinks with other brands in product categories where they viewed the brand to be less important, such as juices.[176] Our own analysis suggests that regular soft drinks were largely substituted by reduced sugar soft drinks over time in response to the SSB tax overhaul in 2019. Averaged over the period from 2019 to 2021, the retail sales volume of regular soft drinks decreased by 37.5 million litres per year, and the retail sales volume of reduced sugar soft drinks increased by 25.9 million litres per year. The development of the volume of retail sales of reduced sugar soft drinks changed from an average decline of -12.7 million litres per year from 2014 to 2018 to positive from 2019. For juices, the changes in consumption patterns do not

[173] Hungarian Ministry of Health (2019).
[174] Cornelsen & Cariedo. (2015). Health-related taxes on foods and beverages. *Food Research Collaboration.*
[175] Reduced-sugar soft drinks are variants of brands with reduced sugar, or where products are sweetened with artificial sweeteners. All products brands with "Light", "Zero", "Free", "Reduced sugar" in the name are reduced sugar. Examples are Coca Cola Zero Sugar, Coca Cola Light, Pepsi Max, Schweppes low-sugar carbonate, Orangina Zero, 7-Up Free, etc. We did check their sugar content rates manually per brand and country. All reduced sugar soft drinks have a maximum sugar content rate of 0.5g of sugar per 100 ml.
[176] Ecorys (2014), Food taxes and their impact on competitiveness in the agri-food sector.

seem to reflect the tax overhaul in 2019. The tax increased for nectars and decreased for juice drinks, however, the consumption of nectars did not decline to a larger extent after 2019 than in previous years, and the consumption of juice drinks declined from 2019 after many years of growth.

Own econometric analysis shows that from the year of the tax overhaul (2019-2021) the increase in the volume of reduced-sugar soft drinks was significant in France, but the consumption of regular soft drinks in France was in decline long before 2019 and actually slowed down after 2019. Hence, the substitution of regular soft drinks for reduced-sugar soft drinks seems more related to consumer awareness rather than the level of the SSB tax. The SSB tax may have increased consumer awareness, but this can only be verified via surveys among consumers.

In **Poland**, the introduction of the SSB tax in 2021 is too recent to analyse the longer-term impact on **product substitution**. Nevertheless, own econometric analysis shows that the volumes of reduced-sugar soft drinks sold actually correlate positively with the volumes of regular soft drinks sold. If the drop in regular soft drink sales in 2021 was attributable to some random shock, the estimations imply that the consumption of reduced-sugar soft drinks would have dropped by 17 million litres in 2021, instead of the observed 2 million litre increase. However, due to the absence of any data for the years after the introduction of the tax, it is too early to clearly identify substitution effects, beyond the observation that the volumes of regular soft drinks and nectars dropped sharply when the SSB tax was introduced in 2021. The general drop in volumes purchased in 2021 may have been caused by COVID-related measures. Therefore, the (slight) increases in the consumption of reduced-sugar soft drinks and juice drinks in 2021 are even more remarkable.

The estimated cross-elasticities of soft drinks with the Eurostat category "juices" are negative for all EU countries indicating that a SSB tax on soft drinks, with an exemption of 100% juices, should result in an increase of 100% juice consumption. Contrary to this expectation, the consumption of 100% juices declined (Belgium and France) or an existing upward trend slowed down (like in Poland) after the introduction or reform based on Euromonitor data. Because 100% juices contain both natural sugar and healthy nutrients, this could be viewed as positive or negative. The estimated cross-elasticities with the Eurostat category of "waters" are even positive, implicating that mineral waters and soft drinks are complements and a reduction of soft drink consumption should result in a reduction of mineral water consumption. However, Kantar data for 2018 and 2019 indicate that the consumption of flavoured waters increased, meaning that the tax effects break through the normal complementary nature of soft drinks and mineral waters and reverse the decline of mineral water consumption that would normally accompany a decline in soft drink consumption. The consumption of tap water is not observed in the available data (Eurostat HBS, Euromonitor or Kantar data). Hence, the effect of the SSB tax on the litres of tap water that people drink (and do not use for cooking, washing, etc.) cannot be analysed. A striking observation based on Kantar data for France is that in 2019 milk was substituted by a leading brand of a non-taxed milk-based drink

with added sugar across all household income categories. However, this was more likely due to a price reduction of this product rather than a substitution effect.

In conclusion, smaller or larger shifts can be observed from taxed to non-taxed products in most countries studied. **An SSB tax typically causes consumption of drinks containing less sugar and mineral waters to increase. These changes can take time to emerge, but we have found no evidence that such trends would be reversed.** Thus, once triggered, such changes in consumer behaviour tend to be structural in nature.

Evidence from the case studies confirms that consumers seem to be more inclined towards product substitution following the introduction of HFSS taxes. In Belgium, there is a clear and consistent trend of substitution from regular to reduced-sugar soft drinks, which extends beyond tax changes. However, in France, the relationship between these two categories of drinks is less straightforward, with no clear evidence of direct substitution. In Poland, due to the absence of any data for the years after the introduction of the tax, it is too early to assess any substitution effects, beyond the observation that the volumes of regular soft drinks and nectars dropped sharply when the SSB tax was introduced in 2021.

2.2.2.4 Affordability

In most countries, roughly **80% of households are consumers of soft drinks**, according to Eurostat HBS 2015 data which covers 15 EU Member States. There is no clear pattern in the percentage of households that buy soft drinks by income groups. On average, both households in the bottom 20% and the top 20% buy on average 36 to 37 litres of soft drinks per year. Households in each of the three middle income categories buy on average 39 to 40 litres of soft drinks per year.

In most countries **the share of equivalised household income[177] spent on soft drinks decreases with income**. Only in Latvia low-income and high-income households spend roughly the same share of their income on soft drinks. Hence, affordability does not mean per se that low-income households cannot afford soft drinks, as their consumption is not much lower than in higher income households, but rather that low-income households already spend a larger part of income on soft drinks and can spend even less on other things if the price increases. In 2015, only five EU countries had an SSB tax (i.e. France, Croatia, Hungary, Latvia and the Netherlands). At that time, most SSB taxes were flat-rate, and Hungary applied a simple two-tier tax schedule. Based on 2015 HBS data[178] there is no significant evidence that the tax rate affects affordability.

[177] Equivalised household income is a weighted income per household member. The first adult household member is allocated weight 1, other adults are allocated weight 0.5 and children below age 14 are allocated weight 0.3. It reflects that the income necessary for adequate living increases with the number of people in the household, but less than proportionally because certain household expenses are shared.

[178] HBS 2010 data are also available, but in 2010 only Latvia and the Netherlands had a tax on soft drinks and a regression would not be meaningful.

However, in each of the four case study countries, the change in consumer expenditures on the taxed products[179] resulted in additional expenditures per household that can be attributed to the tax rate increase. Aggregated across all households, the extra expenditures on taxable products that can be attributed to the introduction or change of SSB taxes vary from EUR 13 million in France (in 2019), to EUR 389 million in Poland (in 2021). The extra expenditures were low in France because in 2019 France reformed an already existing SSB tax while keeping the median tax rate the same.[180] The additional expenditures per household vary from around **EUR 2 per year in France in 2019 up to EUR 35 per year for top-income households in Poland in 2021**.

The aggregate extra consumer expenditures were higher than the tax revenue in Denmark and Poland because more than 100% of the tax was shifted to consumers, whereas in Belgium less than 100% was passed on to consumers. In France, around 100% of the cost was passed through to consumers, and the relatively large discrepancy between the extra consumer expenditures and the change in tax revenue is likely caused by the relatively small changes and the use of data from different sources.

The results of the econometric analysis indicate that both lower income households and households with children would be impacted more by increased prices in all case study countries, as they spend a greater percentage of their total income on HFSS products. Lower income households tend to spend more of their income on HFSS products than higher income households (ranging from 0.44% in France to 1.87% in Belgium). HFSS taxes will impact these households more by increasing the average price of such products more for lower income households than for high-income ones.

In conclusion, lower income households would be impacted more by increased prices, as they spend a higher proportion of their total income on soft drinks. Although low-income households are not targeted specifically, a tax on food or drinks inherently has the biggest impact on the affordability of products for this group. Per household, the increase in the HFSS tax rate caused additional expenditures of EUR 21 to 29 per household per year in Denmark (2011), EUR 24 to 35 in Poland (2021), EUR 9 to 11 in Belgium (2016), and 0.3 to 0.6 EUR in France (in 2019, when an existing SSB tax rate was reformed while keeping the median tax rate the same). Based on Kantar data for France, low-income households reduced their litre consumption to a higher extent in 2019 than in 2018.

Whilst lower income households are known to spend higher proportions of their income on food and drinks and in particular on SBB-taxed products, **we have not found a clear pattern with regard to the percentage of households that buy soft drinks by income group.** Additional expenditures per household

[179] SSBs in Belgium, France and Poland and ice cream, chocolate and other confectionery in Denmark.
[180] The extra expenditures relate closely to the tax revenue depending on the cost pass-through. In Denmark and Poland more than 100% of the tax was passed through to the consumers and hence the extra consumer expenditures in those two countries exceeded the tax revenue.

can be considered modest, varying from around EUR 2 per year in France (2019) up to EUR 35 per year for top-income households in Poland.

2.2.2.5. Cross-border shopping

Cross-border shopping is a differentiated phenomenon in which consumers travel back and forth across the border to purchase cheaper goods. This typically involves individuals crossing national borders to take advantage of differences in prices. To identify the effect of HFSS taxes on cross-border shopping, it is necessary to investigate the spillover effects of the tax on neighbouring countries. If taxing a HFSS product in a Member State not only reduces the overall consumption in the country, but also induces consumers to increase purchases of the taxed product in neighbouring countries, one should observe an increase in sales of HFSS products in these countries.

Since cross-border shopping – in particular for bulkier products like SSBs – is typically very local, it might be difficult to identify the effect on country-level data. Furthermore, if a small country taxes HFSS goods, the impact on the sales in large neighbouring countries can be too small to notice. Despite these difficulties, it is possible to observe some patterns which indicate that cross-border shopping indeed plays a relevant role. SSB taxes, as the most commonly used form of HFSS taxes in Europe, offer the best opportunity to identify cross-border shopping effects.

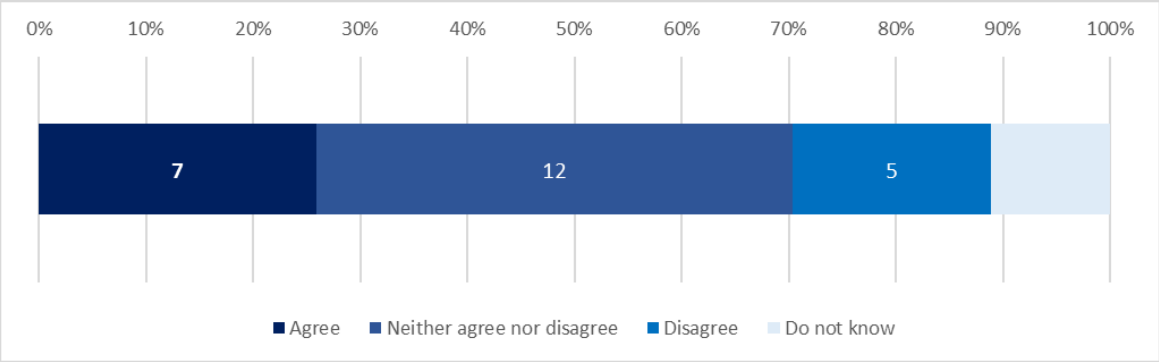
We use the available information about off-trade sales[181] of carbonates in 28 European countries and the information about SBB taxes in 31 European countries to estimate the effect of SBB taxes on the sales in the neighbouring countries.[182] Since it is not possible to identify simultaneous effects for cross-border shopping from multiple neighbouring countries, it is necessary to aggregate the SSB taxes of all neighbouring countries together. The detailed methodology is described in Annex III.

Using population (or population-distance) weighted aggregates of the neighbouring countries' taxes, we can find a statistically significant negative effect of SSB taxes on the off-trade sales in the taxing countries. This would indicate a negative correlation between SSB taxes and sales of SSB products in a country levying SSB taxes. While the coefficient for the weighted SSB taxes of the neighbouring countries is positive, it is not statistically significant. However, once we only include the neighbouring tax rates of countries with a positive price differential, the effect turns statistically significant (see Annex III). This provides moderate evidence for cross-border shopping, albeit the overall **observed effect is driven by cross-border shopping occurring between a few countries (i.e., hotspots).**

Stakeholder opinions on the extent to which cross-border shopping occurs differ. Figure 9 depicts the divergence in views amongst NGOs and consumer organisations consulted: about half the respondents have no clear view on the subject, whilst roughly an equal number of respondents agrees or disagrees with the statement that cross-border shopping is incentivised by HFSS taxes.

[181] Sales of SSBs intended for off-premise consumption (e.g., supermarkets, off-licences, shops, online-stores)
[182] We have information about the SSB taxes in all 27 Member States plus Norway, Switzerland, Turkey and the United Kingdom but no country level sales data is available for Cyprus, Luxembourg and Malta.

Figure 9 Stakeholder opinion on extent to which taxation on HFSS products incentivises consumers shop across the border in a neighbouring country without such taxes



Source: Survey with NGOs and consumer organisations (n=27)

Among tax authorities consulted via the survey conducted in this study, experiences vary across countries, with two authorities indicating cross-border shopping as a factor highly impacting the implementation of HFSS tax in their country, two only partially, while four authorities indicated it as not being an issue for the implementation of the tax (2 did not know). Additionally, cross-border shopping was a factor specifically taken into consideration when designing the tax in Portugal, however only anecdotal evidence of the phenomenon was reported[183].

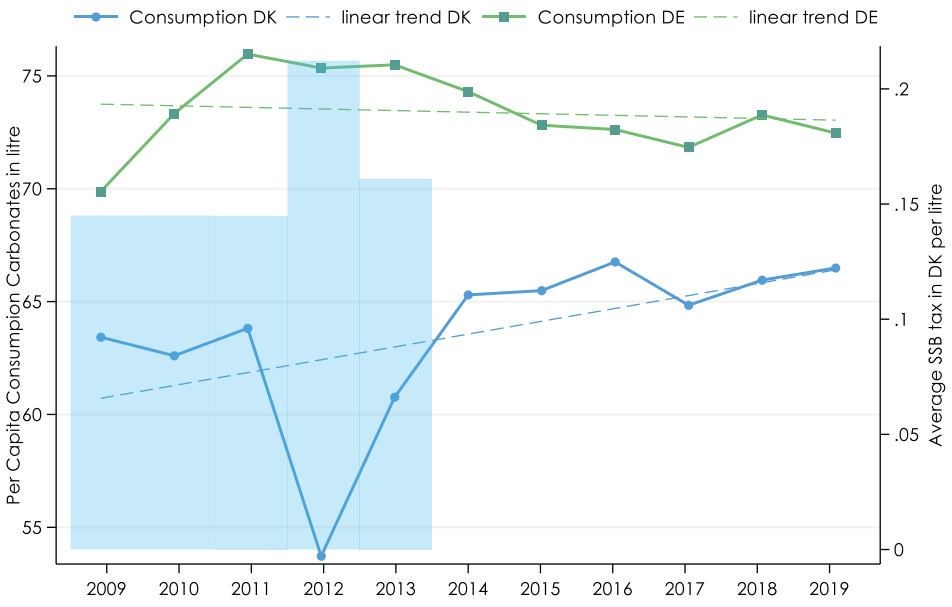
Our case study research points to a more nuanced picture. Differences emerge particularly between small and large EU countries, due to **diverging geographies**. In France and Poland, cross-border shopping induced by SSB taxes appears to be a negligible phenomenon, as the large size of these countries implies that the majority of consumers are not in easy reach of borders. In this context, it is important to consider the bulkiness and relative incidence of the tax in the retail selling price of the SSB taxable products, contrary to alcohol and tobacco, for which the price difference may create sufficient economic incentive to transport across the border; and chocolate and confectionery, which are easier to transport. Furthermore, neither France nor Poland appears to share borders with countries that offer considerably cheaper alternative products.

Cross-border shopping is possibly more common in Belgium and Denmark, both being small countries where larger shares of consumers have access to shopping outlets across the border with more competitive prices in general and notably for foods and drinks (in France and in Germany, respectively). Figure 10 highlights the pattern of per capita consumption of carbonates in Denmark and Germany in the time period 2009 to 2019, which we calculate based on Euromonitor data.[184]

[183] Representative from Portuguese tax authority during workshop

[184] The classification of carbonates originates form the data source (Euromonitor data). Unfortunately, it is not possible to distinguish further into drink categories in the data available to the research team.

Figure 10: Patterns consistent with cross-border shopping for SSB between Denmark and Germany



Source: Own calculations, based on Euromonitor data

During the period January 2012 and June 2013, Denmark increased the SSB tax from € 0.14 per litre to € 0.21. In the second half of 2013 the tax rate was reduced to € 0.11 per litre and abolished, with effect from January 2014.[185] **During the period of the higher SSB tax, a clear drop in consumption in Denmark is observable.** However, the reduction in consumption in Denmark coincides with a positive deviation from the long-term trend in consumption in neighbouring Germany. Such a pattern is consistent with substantial cross-border shopping.

This is corroborated by a study relying on empirical evidence from the SSB tax repealed in 2014, which shows that the tax pass-through increases with distance to the German border, with higher over-shifting taking place at retailers located far away from the border.[186] According to some industry representatives, the increase in retail prices of taxed products induced by the tax prompted consumers to cross the borders in search of cheaper products from Germany and Sweden, and incentivised manufacturers to move production volumes out of Denmark.[187] Industry stakeholders consulted via interviews also reported cross-border shopping as an issue in Denmark, due to the relatively small size of the country.

Furthermore, a report by the Danish Ministry of Taxation[188] concludes that Danish households do shop in other countries and describes the estimated cross-border shopping of consumers as well as its characteristics. Based on the data from external data suppliers, the Ministry's report and Statistics Denmark

[185] The tax rate changes are indicated through the shaded area in Figure 1.
[186] Bergman, U. M., & Hansen, N. L. (2019). Are Excise Taxes on Beverages Fully Passed through to Prices? The Danish Evidence. Finanzarchiv, 75(4), 323-356. https://doi.org/10.1628/fa-2019-0010
[187] See https://www.foodnavigator.com/Article/2013/02/18/Sugar-tax-in-Denmark-a-burden-for-food-and-drink-firms#
[188] Ministry of Taxation of Denmark, Skatteøkonomisk Redegørelse 2021, Chapter 7. Grænsehandel. Available at: https://www.skm.dk/aktuelt/publikationer/rapporter/skatteoekonomisk-redegoerelse-2021/,

(see Annex I, case study Denmark), we conclude that **cross-border shopping of chocolate and sweets has indeed been affected by the changes in duties**. Chocolate and sweets saw an increase in cross-border shopping in the 2012-2016 period (during which various amendments were made in the form of tax rate increases), followed by a decline in the years after. The latest Ministry report[189] covers also the years 2021-2023, and these most recent data mainly show how cross-border shopping is picking up after the pandemic as the numbers have started to increase compared to pre-pandemic levels. Soft drinks represent a significant share of cross-border shopping despite the repeal of the specific duty in 2014, though shopping has decreased consistently since 2012.

The available literature on the link between SSB taxation and the rise in incidence of cross-border shopping in Belgium is sparse. However, the results of our consultation activities unearthed anecdotal evidence on the increased incidence of cross-border shopping in Belgium, as a result of the implementation of SSB taxes. The Belgian tax authorities survey confirmed this, with the Belgian Customs and Excise Authority rating cross-border shopping as one of main factors that are limiting the effectiveness of SSB taxation in Belgium. The Belgian Customs and Excise Authority states that the small size of Belgium, and ease of accessibility to borders with France (but also with Germany, the Netherlands and Luxembourg) makes cross-border shopping a particular problem. The Belgian Ministry of Health further corroborates these findings, stating that there has been a rise in cross-border shopping for SSBs since the introduction of the SSB tax.[190]

The Belgian Ministry of Finance is not aware of studies on cross-border shopping, but this is something that representatives from the Ministry anecdotally observe in practice, although they are not able to assess the magnitude of this phenomenon. This appears to contradict the statement that the SSB tax was initially too low for noticeable effects, however, the SSB tax rate was doubled in 2018. According to the Belgian Ministry of Health, Belgians are turning to France to buy **SSBs mostly due to the lower costs of the average consumer food basket** (40% below the Belgian costs of the average consumer food basket).[191] This finding is confirmed by the trade federation COMEOS, which reports a sharp increase of cross-border shopping particularly towards France for all supermarket products amounting to an alleged leakage of € 668 million in Q1 2023, a 70% increase compared to the year before.[192] The COMEOS statement can be positioned within the context of higher food price increases in Belgium compared to France, and the intended reform of VAT on Belgium food products. Anecdotal evidence from interviews with industry representatives seems to confirm this, by pointing towards cross-border effects[193].

[189] Ministry of Taxation of Denmark, Skatteøkonomisk Redegørelse 2023, Chapter 4. Grænsehandel. Available at: https://www.skm.dk/aktuelt/publikationer/rapporter/skatteoekonomisk-redegoerelse-2023/

[191] Scoping interview with a representative of the Belgian Ministry of Health

[192] Trade federation COMEOS quoted by VRT News https://www.vrt.be/vrtnws/nl/2023/06/26/belgen-gaan-meer-winkelen-in-supermarkten-over-de-grens/

[193] Interview with Belgian industry association

According to a report from the Belgian *Conseil Central de l'Economie*, the excise duties, combined with the levy on packaging and VAT, make Belgian soft drinks significantly more expensive compared to neighbouring countries such as France, Luxembourg and the Netherlands. [194]

According to the sector association of the Belgian water and soft drinks industry, consumers are crossing borders more and more often to save on their products, also due to the already mentioned fact that in addition to VAT and ordinary excise duties, Belgium also levies a tax on packaging. In particular, they claim that 37% of Belgians buy drinks in neighbouring countries, with nearly one in eight Belgians even going there at least once a month.[195] The industry pointed to price differences between countries. A 1.5 litre bottle of soft drink costs[196]:

- €1.53/l in Belgium (Carrefour), SSB tax 11 cents per litre
- €1.27/l in the Netherlands (AH), SSB tax 9 cents per litre
- €0.99/l in Germany (REWE), SSB tax 0 cents per litre
- €1.08/l (for a 1.75 litre bottle) - €1.22/l (for a 1.25 litre bottle) in France, SSB tax 16 cents per litre

It should be noted that these price differences are much larger than the differences in SSB tax rates. Over 2017 to 2021, the Belgian water and soft drinks industry association claims that Belgian companies have lost some 369 million EUR in turnover due to cross-border purchases, with the Belgian tax representing approximately 45% of the retail price.[197] This claim could only make sense if income tax that firms withhold on employee wages are included, because the SSB tax is only 11 cents per litre and thus accounts for only 7% of the price, the packaging tax is 10 cents per litre and thus 6.5% of the price, and VAT on soft drinks is 6% in Belgium as opposed to 9% in the Netherlands, 19% in Germany, and 5.5% in France. **Hence, the increased cross-border shopping is likely due to price differences in general rather than the SSB tax or even consumption taxes in general.**

A **Portuguese** study states that producers claimed that the SSB tax induced cross-border shopping in Spain.[198] It also states that one leading retail company reported a stronger 10.3% decline of soft drink volumes sold in stores with exposure to the Spanish market compared to 8.7% in stores without exposure to the Spanish market.

Overall, at EU level, **we observe limited evidence of cross-border shopping**, which can largely be linked to this phenomenon occurring between a few countries only. Nevertheless, at the level of individual Member States, cross-border shopping can be noticed in certain hotspots, especially so in smaller jurisdictions (e.g., Belgium, Denmark and Portugal), where larger shares of consumers have access to more competitive offers across the border.

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[194] Conseil Central de l'Economie (2021), Évolution des taxes indirectes pour certaines boissons en Belgique et dans les pays voisins, available here
[195] FIEB VIWF (2022), *Près de 4 Belges sur 10 achètent des boissons au-delà de la frontière*, available here
[196] Ibid.
[197] Ibid.
[198] Relatorio do Grupo de Trabalho nr. 2774/2018, impacto do imposto especial sobre o consumo de bebibas-acucaradas e adicionadas de edulcorantes, page 60, https://www.portugal.gov.pt/pt/gc21/comunicacao/documento?i=impacto-do-imposto-especial-sobre-o-consumo-de-de-bebibas-acucaradas-e-adicionadas-e-edulcorantes

Although it is difficult to isolate the role of HFSS taxes within such global differences of price baskets across Member States, it is clear from comparisons of differences in prices of soft drinks with differences in tax rates in the case of Belgium, that tax rates at best explain only a small part of the price differences. In Denmark, we conclude that cross-border shopping of chocolate and sweets has indeed been affected by the changes in excise duties, while changes in SBB taxes during the 2012 – 2013 period coincided with higher SSB sales volumes in neighbouring countries.

2.2.3. Indirect effects on public health

Before reviewing the evidence, it is pertinent to provide a brief overview of methodological approaches adopted in the health economics literature, their advantages and limitations, and overall conclusions. Simulation studies (e.g., Barrientos-Gutierrez et al. 2017; Goiana-da-Silva et al. 2020; Lal et al. 2017; Wilde et al. 2019; Manyema et al. 2014 and Long et al. 2015)[199] are based on mathematical models that link observed (or simulated) effects of behaviour to longitudinal health outcomes relying on existing empirical evidence on the intermediary steps.[200] These studies naturally rely on a number of assumptions, regarding, for instance, the structure of the longitudinal relationships,[201] but also on potential substitution effects on other sources of calories, and the persistence of behavioural effects only observed in the short run. Moreover, the results are strongly heterogeneous across study contexts and tax designs, as well as the specific health or disease endpoints considered. There is still a need for ex-post evaluation studies of taxes on foods and beverages, especially taxes on unhealthy foods, to understand their effects in different contexts.

Overall, the literature review conducted in this study collects evidence from a variety of sources and methodological approaches, covering meta-analyses and systematic reviews, simulation studies, RCTs and observational studies. These studies address general population health outcomes (e.g. reduced obesity and increased life expectancy) and specific disease endpoints. The effect of calorie or energy intake on BMI is a common indicator for assessing population health effects. In addition, the research papers identified in the reviewed literature consider a variety of disease endpoints. These include cardiovascular diseases,

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[199] Barrientos-Gutierrez T, Zepeda-Tello R, Rodrigues ER, Colchero-Aragonés A, Rojas-Martínez R, Lazcano-Ponce E, et al. (2017) Expected population weight and diabetes impact of the 1-peso-per-litre tax to sugar sweetened beverages in Mexico. PLoS ONE;12(5):e0176336. pmid:28520716; Goiana-da-Silva F, Severo M, Cruz ESD, Gregório MJ, Allen LN, Muc M, et al. (2020) Projected impact of the Portuguese sugar-sweetened beverage tax on obesity incidence across different age groups: A modelling study. PLoS Med.;17(3):e1003036; Lal A, Mantilla-Herrera AM, Veerman L, Backholer K, Sacks G, Moodie M, Siahpush M, Carter R, Peeters A. (2017) Modelled health benefits of a sugar-sweetened beverage tax across different socioeconomic groups in Australia: A cost-effectiveness and equity analysis. PLoS Med. Jun 27;14(6):e1002326. doi: 10.1371/journal.pmed.1002326; Wilde P, Huang Y, Sy S, Abrahams-Gessel S, Jardim TV, Paarlberg R, Mozaffarian D, Micha R, Gaziano T. Cost-Effectiveness of a US National Sugar-Sweetened Beverage Tax With a Multistakeholder Approach: Who Pays and Who Benefits. Am J Public Health. 2019 Feb;109(2):276-284. doi: 10.2105/AJPH.2018.304803; Manyema M, Veerman LJ, Chola L, Tugendhaft A, Sartorius B, Labadarios D, Hofman KJ. The potential impact of a 20% tax on sugar-sweetened beverages on obesity in South African adults: a mathematical model. PLoS One. 2014 Aug 19;9(8):e105287. doi: 10.1371/journal.pone.0105287; Michael W. Long, ScD, Steven L. Gortmaker, PhD, Zachary J. Ward, MPH, Stephen C. Resch, PhD, Marj L. Moodie, DrPH, Gary Sacks, PhD, Boyd A. Swinburn, MD, Rob C. Carter, PhD, Y. Claire Wang, MD, ScD, Cost Effectiveness of a Sugar-Sweetened Beverage Excise Tax in the U.S., Am J Prev Med 2015;49(1):112–123.

[200] Eyles H, Ni Mhurchu C, Nghiem N, Blakely T. (2012) Food pricing strategies, population diets, and non-communicable disease: a systematic review of simulation studies. PLoS Med.;9(12):e1001353. doi: 10.1371/journal.pmed.1001353.

[201] Lin, B. Travis A. Smith, Lee, JY Kevin Hall D., (2011) Measuring weight outcomes for obesity intervention strategies: The case of a sugar-sweetened beverage tax, Economics & Human Biology, 9, 4, 329-341, https://doi.org/10.1016/j.ehb.2011.08.007.

type 2 diabetes, non-fatty liver disease, hypertension, and certain types of cancers, as well as all-cause mortality. Therefore, the following presentation of important results identified in the literature survey will also address the relative merits of the methodological approaches covered in the reviewed literature, the health or disease endpoints considered, as well as key analytical categories such as food environments and dietary decision-making.

Whether HFSS taxes can induce behavioural changes in populations and deliver tangible public health benefits depends on a number of factors, as pointed out above. **The insights from the stakeholder consultations undertaken in this study** confirm that **obesity is multifactorial and a complex societal issue.** Modelling or simulation studies constitute a large proportion of econometric analyses on the effect of HFSS taxes on longer-term health and disease outcomes. In contrast, **there are few ex-post studies based on observational data**. The lack of **specific observational evidence** on the effects of HFSS taxes on health is mostly due to the fact that they were introduced relatively recently compared to the long timespan from behavioural effects on the intake of added sugars, to effects on intermediary risk factors such as obesity, and from there to health endpoints such as disease incidence. This point is well acknowledged by international organisations such as the WHO and is partially addressed by simulation studies that mathematically model the impact of HFSS taxes on population health outcomes.[202] As a result, as Hattersley et al. (2020) point out, the health economics literature relies disproportionally **on modelling and simulation studies** that model the potential impacts of HFSS taxes on avoidable disease and premature deaths.[203]

An important policy inference from the simulation studies is that HFSS taxes would reduce significant health care expenditures. The econometric or modelling studies model the potential impacts of such taxes on health and disease outcomes by combining price elasticity estimates with data on sales and/or consumption and health outcomes/burden of disease. The strength of evidence from simulation studies is strongly influenced by the data and assumptions incorporated into the models. Although not perfect, these studies consistently show that HFSS taxes can lead to significant reductions in DALYs, prevalence and incidence rates of obesity and type 2 diabetes, as well as dental caries.

The evidence from the modelling studies indicates "that **SSB taxes have the potential to improve population health**".[204] Studies rely on different methodological approaches to model the relation between the behavioural change, risk factors, and eventually health outcomes. All studies use changes in the intake of calories due to the SSB tax (estimated from price elasticities) as the starting point. Most studies use the effect of caloric intake on weight (or BMI) as the mechanism through which effects on the health endpoints are modelled. The relationship between caloric intake and weight/BMI is generally

[202] WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets.
[203] L. Hattersley, A. Fuchs, A. Gonima, L. Silver, K. Mandeville, Business, Employment and Productivity Impacts of SSB Taxes, Knowledge Brief, World Bank Group, June 2020, p. 3.
[204] WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets.

based on relatively simple linear static relations from the empirical literature,[205] although more dynamic approaches are also used.[206] Different health endpoints are used. Some studies use BMI or obesity as the final health outcome.[207] Other studies, relying on Markov- or multi-state-lifetable-models, use general health outcomes (QALY, HALY[208]). Blakely et al. (2020) and Lal et al. (2017) use a multi-state lifetable model to estimate the impact of changes in BMI on the prevalence of a larger number of diseases which are then translated into HALYs.[209] Wilde et al. (2019) use a similar approach based on a microsimulation model for cardiovascular disease (coronary heart disease including cardiac arrest, myocardial infarction, angina, and stroke) which are translated into QALYs.[210] Long et al. (2015) use estimates for the relation between BMI and QALYs to model general health outcomes directly, i.e., increased life expectancy and reduced obesity disparities instead of indirectly through disease outcomes.[211]

The above-mentioned simulation studies cover different countries and evaluate different types of SSB taxes, but they all report significant **reductions in average population weight and BMI** (Table 2).

Table 2: Overview of simulated effects on weight and/or BMI for three OECD countries

Study	Country	Tax	Consumption	BMI/Weight
Barrientos-Gutierrez et al. (2017)	Mexico	1-peso-per litre tax on SSB	Volume intake (ml/person/day): -21.62 caloric intake reduction (kcal/person/day) -8.38	Average reduction of 0.15 kg/m2 per person, which translates into a 2.54% reduction in obesity prevalence
Long et al. (2015)	United States	$0.01/ounce of SSBs	Change in kcal/day between -8 and -50 for adults	Reduction in average BMI for adults: 0.08

[205] Hall, KD, G. Sacks, D. Chandramohan, C.C. Chow, Y.C. Wang, S.L. Gortmaker, B.A. Swinburn, Quantification of the effect of energy imbalance on bodyweight. Lancet, 378 (9793) (2011), pp. 826-837.

[206] Lin, B Travis A. Smith, Lee,JY Kevin D. Hall, Measuring weight outcomes for obesity intervention strategies: The case of a sugar-sweetened beverage tax, Economics & Human Biology, 9, 4, 2011, 329-341, https://doi.org/10.1016/j.ehb.2011.08.007.

[207] Barrientos-Gutierrez T, Zepeda-Tello R, Rodrigues ER, Colchero-Aragonés A, Rojas-Martínez R, Lazcano-Ponce E, et al. Expected population weight and diabetes impact of the 1-peso-per-litre tax to sugar sweetened beverages in Mexico. PLoS ONE. 2017;12(5):e0176336. pmid:28520716; Lin, B Travis A. Smith, Lee,JY Kevin D. Hall, Measuring weight outcomes for obesity intervention strategies: The case of a sugar-sweetened beverage tax, Economics & Human Biology, 9, 4, 2011, 329-341, https://doi.org/10.1016/j.ehb.2011.08.007.

[208] QALYs, DALYs and HALYs are used to measure the value of health outcomes (i.e. the burden of disease and the impact of health interventions), combining the length and quality of life. QALYs stands for Quality-Adjusted Life Years and measures the years lived in perfect health gained due to an intervention or treatment. DALYs stands for Disability-Adjusted Life Years and measures the years of life lost to due to premature mortality and the years lived with a disability due to prevalent cases of a disease or health condition in a population. HALYs stands for Health-Adjusted Life Years and are an aggregation of life years adjusted for the quality of life lived during those life years.

[209] Blakely T, Moss R, Collins J, Mizdrak A, Singh A, Carvalho N, Wilson N, Geard N, Flaxman A (2020). Proportional multistate lifetable modelling of preventive interventions: concepts, code and worked examples. Int J Epidemiol. Oct 1;49(5):1624-1636. doi: 10.1093/ije/dyaa132; Lal A, Mantilla-Herrera AM, Veerman L, Backholer K, Sacks G, Moodie M, Siahpush M, Carter R, Peeters A. (2017) Modelled health benefits of a sugar-sweetened beverage tax across different socioeconomic groups in Australia: A cost-effectiveness and equity analysis. PLoS Med. Jun 27;14(6):e1002326. doi: 10.1371/journal.pmed.1002326.

[210] Wilde P, Huang Y, Sy S, Abrahams-Gessel S, Jardim TV, Paarlberg R, Mozaffarian D, Micha R, Gaziano T. (2019) Cost-Effectiveness of a US National Sugar-Sweetened Beverage Tax With a Multistakeholder Approach: Who Pays and Who Benefits. Am J Public Health. Feb;109(2):276-284. doi: 10.2105/AJPH.2018.304803.

[211] Long MD, Gortmaker SL, Ward ZJ, Resch SC, Moodie ML, Sacks G, Swinburn BA, Carter RC, Wang YC. (2015) Cost Effectiveness of a Sugar-Sweetened Beverage Excise Tax in the U.S. American J Preventive Medicine, 49, 1, July, 112-123.

Study	Country	Tax	Consumption	BMI/Weight
			(depending on sex and age)	
Lal et al. (2017)	Australia	20% sales tax on SSBs	Average change in intake of 49 kcal/day	Reduction in average weight between 0.2 and 1 kg depending on age and income (adults)

As stated above, health impacts can only be expected where price changes have effectively resulted in a reduction in demand and consumption, for which evidence from Member States is required. In **Belgium**, where the SSB tax amounts only to a few euro cents per litre of soft drinks, such price changes are considered to be too small to effect a noticeable change in people's consumption behaviour. Similarly, comparative studies have already indicated that the introduction of the SSB tax in Belgium was associated with a very small reduction in the prevalence of daily soda consumption in comparison to **Finland, France, Hungary, Latvia and Portugal**.[212]

Evaluation studies (**Denmark,**[213] **France,**[214]**and Spain**[215]**)** and a modelling study for **Portugal**[216] identify positive health impacts of the HFSS taxes levied in these countries. The studies for Denmark refer to the now abolished fat tax on saturated fats but can be cited here as a point of comparison. Two studies (Bodker et al., 2015[217], Smed et al., 2016[218]) evaluate the long-term impacts of the fat tax levied until 2014 on population health. Specifically, Bodker et al. (2015) find that the implementation of the Danish fat tax (2011-2013) led to marginal changes in the population's risk of ischemic heart disease (IHD).[219] Smed et al. (2016) evaluate the effect of the Danish fat tax on nutritional outcomes and model the associated changes in mortality for different age groups and genders.[220] They estimate that the tax resulted in a 4.0% reduction in saturated fat intake and an increase in vegetable and salt consumption; the changes are noted for most individuals, except younger females.[221] Smed et al.

[212] Chatelan A, Rouche M, Dzielska A, Fismen AS, Kelly C, Pedroni C, Desbouys L, Castetbon K. (2022) Sixteen-year trends in adolescent consumption of sugar-sweetened soda in six European countries with a soda tax and comparison countries: a repeated cross-sectional survey analysis. Public Health Nutr, Nov 2;26(3):1-12. doi: 10.1017/S1368980022002361.

[213] Bødker M, Pisinger C, Toft U, Jørgensen T. (2015) The rise and fall of the world's first fat tax. Health Policy. Jun;119(6):737-42. doi: 10.1016/j.healthpol.2015.03.003; Smed, S., Scarborough, P., Rayner, M. *et al.* (2016). The effects of the Danish saturated fat tax on food and nutrient intake and modelled health outcomes: an econometric and comparative risk assessment evaluation. *Eur J Clin Nutr* **70**, 681–686 https://doi.org/10.1038/ejcn.2016.6.

[214] Gangl S. (2021) *Do soda taxes affect the consumption and health of school-aged children? Evidence from France and Hungary*. VfS Annual Conference 2020 (Virtual Conference): Gender Economics 224577, Verein für Socialpolitik / German Economic Association.

[215] HadEA (2022), Mapping of pricing policies and fiscal measures applied to food, non-alcoholic and alcoholic beverages

[216] Goiana-da-Silva F, Severo M, Cruz E Silva D, Gregório MJ, Allen LN, Muc M, Morais Nunes A, Torres D, Miraldo M, Ashrafian H, Rito A, Wickramasinghe K, Breda J, Darzi A, Araújo F, Lopes C. (2020) Projected impact of the Portuguese sugar-sweetened beverage tax on obesity incidence across different age groups: A modelling study. PLoS Med. Mar 12;17(3):e1003036. doi: 10.1371/journal.pmed.1003036.

[217] Bødker M, Pisinger C, Toft U, Jørgensen T. (2015) The rise and fall of the world's first fat tax. Health Policy. Jun;119(6):737-42. doi: 10.1016/j.healthpol.2015.03.003.

[218] Smed, S., Scarborough, P., Rayner, M. *et al.* The effects of the Danish saturated fat tax on food and nutrient intake and modelled health outcomes: an econometric and comparative risk assessment evaluation. *Eur J Clin Nutr* **70**, 681–686 (2016). https://doi.org/10.1038/ejcn.2016.6.

[219] Bødker M, Pisinger C, Toft U, Jørgensen T. The rise and fall of the world's first fat tax. Health Policy. 2015 Jun;119(6):737-42. doi: 10.1016/j.healthpol.2015.03.003.

[220] Smed, S., Scarborough, P., Rayner, M. *et al.* The effects of the Danish saturated fat tax on food and nutrient intake and modelled health outcomes: an econometric and comparative risk assessment evaluation. *Eur J Clin Nutr* **70**, 681–686 (2016). https://doi.org/10.1038/ejcn.2016.6.

[221] Ibid.

(2016) find a modelled reduction in mortality with 123 lives saved annually (i.e., 0.4% of all deaths from NCDs[222]), 76 of them in the age group below 75 years.

For **France**, there is empirical evidence on the health outcomes of the **2012 SSB tax**. Since the effects of the current 2018 SSB tax are currently under evaluation, the impacts of the 2012 tax provide a comparable point of comparison for this study. The literature review identified one cross-sectional survey of school-aged children (Gangl et al. 2021)[223] and one review (Cornelsen et al. 2015).[224] The study by Gangl et al. (2021) shows that the 2012 SSB tax did not affect the consumption patterns or the BMI of school-aged children in **France**, in contrast to **Hungary**[225] for which the study results suggest a positive effect of the tax on SSB consumption. The reason for this finding could be the substitution of other unhealthy beverages, which are taxed at a higher rate, with sodas. The effect of the SSB tax in France is negative as expected, but insignificant possibly caused by a low tax rate[226]. The findings show that BMI was unaffected by the tax in every country.

However, there is emerging evidence suggesting that the link between HFSS taxes and patterns of healthy consumption is not straightforward. Cornelsen et al. (2015) argue that the health impact of SSB taxes, or HFSS taxes more generally, is a **cumulative effect of the direct and indirect effects** impacting the demand and supply side.[227] More specifically, these refer to the direct impact of the taxes (on consumer demand), indirect impacts from consumer demand, and the indirect impacts from the supply side (response of producers and supermarkets). Thus, to fully appreciate the overall impact of taxes on unhealthy foods and beverages, evidence should be gathered on all these parameters and the whole chain of direct/indirect effects, as failing to do so may hinder a full understanding and assessment of the desired health benefits of the tax.

In **Portugal**, the implementation of the SSB tax and consequent reduction in the sugar content of SSBs were identified as having beneficial public health impacts. Goiana-da-Silva et al. (2020) performed a national market analysis and population-wide modelling study using market data for the years 2014 to 2018.[228] The study results show a reduction in SSBs sold of 6.6 million litres per year.[229] Product reformulation led to a decrease in the average energy density

[222] Ibid.
[223] Gangl S. (2021) *Do soda taxes affect the consumption and health of school-aged children? Evidence from France and Hungary*. VfS Annual Conference 2020 (Virtual Conference): Gender Economics 224577, Verein für Socialpolitik / German Economic Association.
[224] L. Cornelsen, R. Green, A. Dangour, R. Smith, Why fat taxes won't make us thin, *Journal of Public Health*, 37, 1, March 2015, pp. 18-23.
[225] Gangl S. (2021) *Do soda taxes affect the consumption and health of school-aged children? Evidence from France and Hungary*. VfS Annual Conference 2020 (Virtual Conference): Gender Economics 224577, Verein für Socialpolitik / German Economic Association.
[226] This refers to the tax rate before the 2018 reform, when the flat rate was replaced by progressive tax schedule tiered by sugar content.
[227] Cornelsen L, Green R., Dangour A., Smith R. (2015) Why fat taxes won't make us thin, *Journal of Public Health*, 37, 1, March, pp. 18-23, https://doi.org/10.1093/pubmed/fdu032.
[228] Goiana-da-Silva F, Severo M, Cruz E Silva D, Gregório MJ, Allen LN, Muc M, Morais Nunes A, Torres D, Miraldo M, Ashrafian H, Rito A, Wickramasinghe K, Breda J, Darzi A, Araújo F, Lopes C. (2020) Projected impact of the Portuguese sugar-sweetened beverage tax on obesity incidence across different age groups: A modelling study. PLoS Med. Mar 12;17(3):e1003036. Doi: 10.1371/journal.pmed.1003036.
[229] Ibid.

of SSBs by 3.1 kcal/100 ml. [230] This is estimated to have prevented around 40-78 cases of obesity per year between 2016 and 2018, with the biggest projected impact observed in adolescents 10 to <18 years old. The model shows that the implementation of the Portuguese SSB tax allowed for a four to eight times larger projected impact against obesity than would be achieved though reformulation alone.[231] In other words, Goiana-da-Silva et al. (2020) find that the tax triggered both a reduction in demand and product reformulation.[232] These, together, can reduce obesity levels among frequent consumers of SSBs in the Portuguese population.

In the case of Catalonia (**Spain**), the SSB tax shows to be an efficient measure to improve health and reduce health spending, albeit results were modelled with short-term data for the medium and long term.[233] Results from the 2019-2020 Catalan Public Health Survey show a positive health effect among lower socio-economic groups.[234] Specifically, positive health effects include reducing the prevalence of diabetes in the adult population (from 8.5% in 2017 to 7.9% in 2020), the proportion of adults who are overweight (from 34.5% to 33.7% in the same time span) and the proportion of children aged 6-12 years old who are overweight (from 25% to 24.2%).[235] Yet, the share of obese people increased in both the adult population (from 14.9% to 17%) and children aged 6-12 years old (from 10.5% to 11.7%). This is likely attributable to the effects of the COVID-19 pandemic.[236]

On the whole, the literature review identified a paucity of stand-alone observational studies and evaluations examining the health impacts and outcomes of fiscal measures on HFSS products in general and SSB taxes in particular in EU Member States. Beyond the literature and evidence cited above, the review did not find independent scientific literature on the health impacts of taxes on HFSS products for **Belgium, Croatia, Finland, Ireland, Latvia**, the **Netherlands** and **Poland**. For **Belgium**, the Ministry of Health representative pointed out that a government commissioned study on the health impact of the SSB taxes was not in the public domain.[237] Similarly, academic experts and representatives at the Ministry of Health in **France** point out that there is little scientific evidence on the health impacts of the 2018 SSB tax.[238] The French Ministry of Health stated that an evaluation of the health impacts of the 2018 SSB tax in France is underway, with the final report due at the end of 2023.[239]

In conclusion, evidence on the health effects of SSB taxes derives mainly from simulation studies and indicates that **SSB taxes have the potential to improve population health.** Available (limited) empirical evidence also identified positive health impacts of HFSS taxes. Most notably, health benefits

[230] Ibid.
[231] Ibid.
[232] Ibid.
[233] Mapping of pricing policies and fiscal measures applied to food, non-alcoholic and alcoholic beverages.
[234] Ibid.
[235] Ibid.
[236] Ibid.
[237] Interview with Belgian Ministry of Health.
[238] Interview with academic experts from EHESP.
[239] Interview with Ministry of Health, France.

can be controlled through reduced consumption of unhealthy taxed products and/or product reformulation.

2.3. HFSS taxes in practice

2.3.1 Tax revenue considerations

As already mentioned, while pursuing health goals, HFSS taxes can also serve a fiscal objective. The ability to raise revenues from such taxes will depend on the tax design and consumer reactions. Whilst tax revenue estimates are often made ex ante in the run-up to the implementation of HFSS taxes, the tax revenues effectively generated may deviate from those anticipations.

In general, actual tax revenues often fall short compared to ex ante projections due to the 'Pigouvian' nature of the tax. While this should be taken into account in ex ante estimations, these, due to the impossibility to precisely foresee producers' or consumers' reactions based on existing empirical evidence offering rather broad ranges, either neglect potential reactions to the tax or integrate them based on ad hoc assumptions on producer or consumer reactions.

Generally, there can be a trade-off between policy goals, as the more a HFSS tax reduces the consumption of the taxed goods the less it can contribute to revenue generation and vice versa. Lower than expected revenues can also be driven by changes in the composition of products made by manufacturers by eliminating those ingredients which are covered by the levy and/or by changes in consumption behaviour.

This makes it particularly challenging to project HFSS taxes revenues. These can be estimated ex ante by simulation studies that exist for a number of countries.[240] However, despite tangible results from modelling studies, the World Bank also warns that international experiences with implemented SSB taxes show that revenue generation is difficult to predict precisely, particularly if the tax successfully incentivises product reformulation.[241]

Table 3 shows the revenues raised from HFSS taxes in place across the EU.

[240] Sánchez-Romero L, Penko J, Coxson P. et al. 2016. Projected impact of Mexico's sugar sweetened beverage tax policy on diabetes and cardiovascular disease: a modeling study. *PLoS Medicine* 13: e1002158.

[241] L. Hattersley, A. Fuchs, A. Gonima, L. Silver, K. Mandeville, Business, Employment and Productivity Impacts of SSB Taxes, Knowledge Brief, World Bank Group, June 2020, p. 4.

Table 3: Revenues raised from taxes on HFSS products across the EU

Country	Designation of tax	Item in National Tax List	Year of introduction	Revenues (€m), 2021	Revenues (€m), 2017-2021 average	Revenues (% of GDP), 2021	Revenues (% of GDP), 2017-2021 average	Revenues (% of total tax revenues), 2021[242]	Revenues (% of government health expenditure), 2021[243]
Belgium	*Loi relative au régime d'accise des boissons non alcoolisées et du café*	Excise duties on non-alcoholic beverages	2009	164.1	162.3	0.033%	0.035%	0.08%	0.4%
Croatia	*Zakon o posebnom porezu na kavu I bezalkoholna pića*	Special tax on coffee and non-alcoholic drinks	1994	32.6	23.2	0.056%	0.044%	0.13%	0.7%
Denmark	*Afgift af konsumis* (Ice cream tax)	Duty on ice cream	1946	52.9	48.8	0.016%	0.016%	0.03%	0.17%
	Afgift af chokolade og Sukkervarer (Chocolate and sweet confectionary tax)	Sales duties on chocolate and sugar confectionery, etc.	1922	324.1	301.7	0.096%	0.097%	0.2%	1.04%
Finland	*Virvoitusjuomavero/ Punktskatt på läskedrycker*	Excise duties on soft drinks	1994	221	183	0.088%	0.077%	0.2%	1.14%
France[244]	*Contributions sur les boissons non alcooliques*	Not available	2012	454	426.7	0.019%	0.018%	0.04%	0.2%

[242] Own calculations based on Eurostat, *Total receipts from taxes and social contributions*. Data extracted in April 2023.
[243] Own calculations based on Eurostat, *General government expenditure by function*. Data extracted in April 2023.
[244] Data from budget.gouv.fr, available here.

Country	Designation of tax	Item in National Tax List	Year of introduction	Revenues (€m), 2021	Revenues (€m), 2017-2021 average	Revenues (% of GDP), 2021	Revenues (% of GDP), 2017-2021 average	Revenues (% of total tax revenues), 2021[242]	Revenues (% of government health expenditure), 2021[243]
Hungary	*Népegészségügyi termékadó*	Public health product tax	2011	185.1	151.3	0.120%	0.109%	0.35%	2.1%
Ireland	*Cáin ar Dheochanna Siúcra-Mhilsithe*	Sugar Tax	2018	30.6	20.8[245]	0.007%	0.007%[246]	0.03%	0.14%
Latvia	*Akcīzes nodoklis pārējām akcīzes precēm*	Excise duty on other excise goods	2004	22	17.7	0.065%	0.059%	0.18%	1.05%
Netherlands	*Verbruiksbelasting op alcoholvrije dranken*	Tax on non-alcoholic drinks	1992	268	269.8	0.031%	0.034%	0.08%	0.36%
Poland	*Podatek Cukrowy*	Receipts from the levy on foodstuffs	2021	322.7	-	0.056%	-	0.15%	0.97%
Portugal	*Imposto sobre as bebidas adicionadas de açúcar ou tros edulcorantes 68*	Excise duties on imported beverages with added sugar or other sweeteners	2017	52	62.7	0.024%	0.03%	0.06%	0.32%
Catalonia (Spain)	*Impost sobre begudes ensucrades envasades*	Not available	2017	29.1[247]	32.1[248]	0.013%[249]	0.013%[250]		0.3%[251]

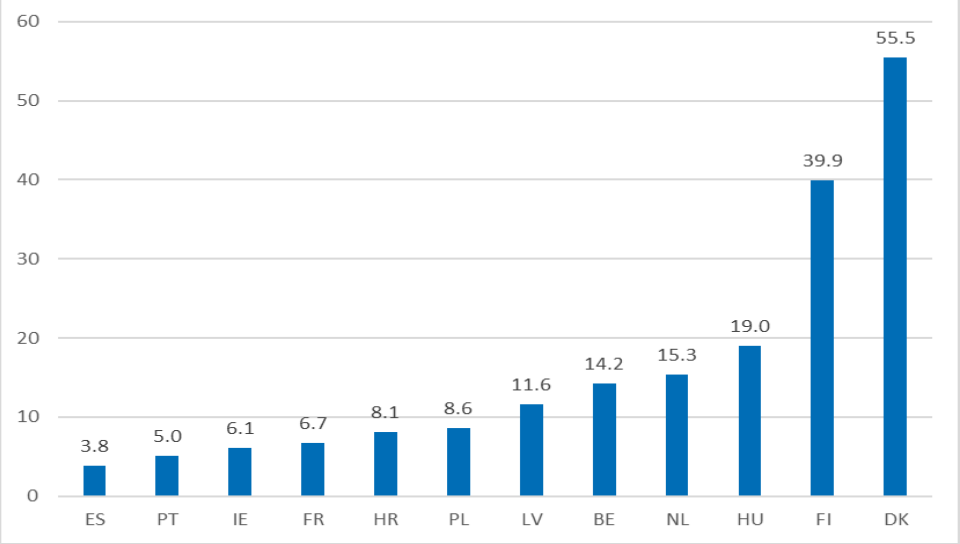
Source: European Commission (National Tax List 10/31/2022); own compilation.

[245] 2018-2021 average.
[246] 2018-2021 average.
[247] 2020 – Source: Statistical Institute of Catalonia.
[248] 2017-2020 average - Statistical Institute of Catalonia.
[249] 2020 – GDP data: Statistical Institute of Catalonia.
[250] 2017-2020 average – GDP data: Statistical Institute of Catalonia.
[251] 2020 – Health expenditure: Statistical Institute of Catalonia.

Identifying clear-cut trends regarding revenue generation across the EU proves to be a complex exercise, since the effectiveness of HFSS taxes and therefore their revenue potential depends on a complex combination of country-specific factors, including the tax design (particularly the scope of the tax, including exemptions, and the level of tax rates), the extent of the underlying consumption of taxed products, the extent of tax pass-through to consumer prices, and the sensitivity of demand towards price changes (price elasticity of demand).

Relative to GDP, the revenues raised from existing HFSS taxes in the EU are relatively modest, with substantial differences across countries, ranging between 0.007% of GDP in Ireland to 0.12% of GDP in Hungary (Figure 11 On average, the tax revenue in 2021 was 0.05% of GDP in the 11 countries with an SSB tax. Tax revenues per capita differ widely across countries (Figure 10), ranging from €3.8 to €5 per capita in Catalonia and Portugal, respectively, to €14 to €15 in Belgium and the Netherlands, while (much) higher levels are reached for taxes wider in scope, namely Hungary (€19), Finland (€39.9) and Denmark (€55.5).

Figure 11: HFSS tax revenues per capita (€) – 2021[252]

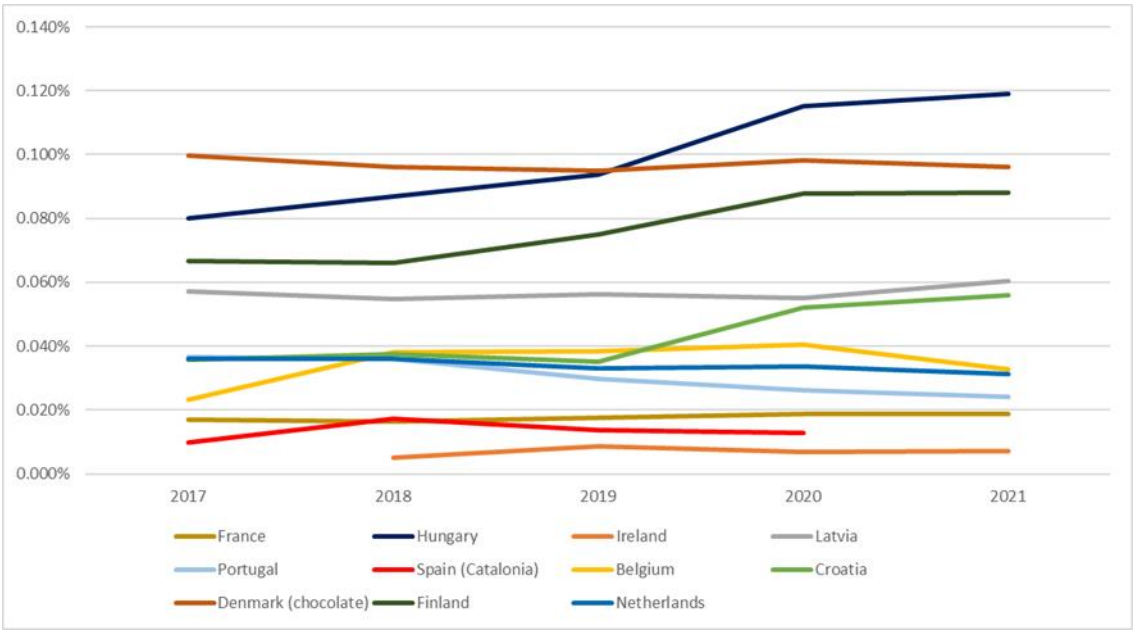


Source: Ecorys based on Eurostat (population) and National tax list (revenue data).

Tax revenues (expressed in absolute values) show a slightly upward trend in several countries, especially in Finland, Croatia, Hungary and Latvia, where the increase appears more pronounced over the five year period studied. In other countries, tax revenues remain relatively stable over time (Belgium, Netherlands and Ireland) or decrease (e.g. Portugal). Similar trends can be observed when looking at tax revenues expressed in % of GDP, as shown in Figure 12.

[252] For ES (Catalonia), reference year is 2020.

Figure 12: Tax revenues raised from taxes on HFSS products across the EU from 2017 to 2021 (% of GDP)



Source: European Commission (National Tax List 10/31/2022); own compilation. Exchange rate national currency per EUR based on ECB reference rates.

Overall, among the tax administrations consulted during the survey, **60% assessed the effectiveness of the HFSS tax in their country to be satisfactory in relation to the initial fiscal objectives** and 30% deemed it to be partially satisfactory (one administration did not know). Relevant experiences differ across countries. While in **Hungary** evaluations have shown how the estimated tax revenue at the time of introduction was almost fully realised (less than a 5% deviation)[253], data also shows that sometimes revenue generation has fallen short of its intended target. In **Belgium**, for instance, when the tax was introduced, it was expected to generate €50 million in the first year, in the hope that this amount would increase each year to reach €250 million by 2020[254]. The actual revenues generated in Belgium between 2017 and 2021 amounted to €162 million on average. In **Portugal**, while the estimated revenue collected in the first year (2017) was almost fully realised, it seemed to fall short in 2018[255], and decreased in the following years. In 2021, the tax in **Poland** generated €322.7 million (0.056% of GDP)[256], about half the original projection of €636 million (€53 million (PLN 250 million) per month),[257] although the effects of the pandemic need to be taken into account.

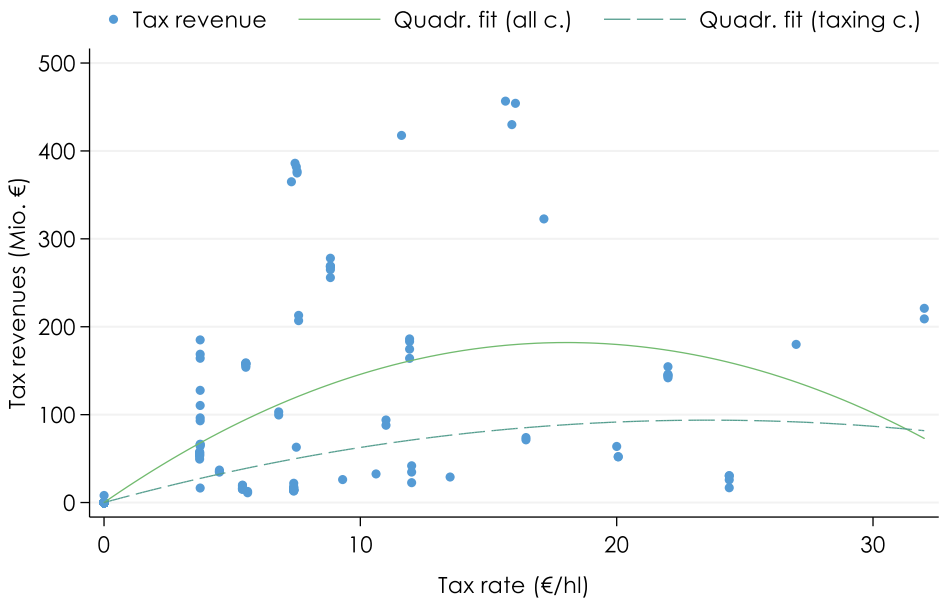
The results of our econometric analysis confirm the existence of a non-linear relationship between tax rates and revenues for SSB taxes in the EU.[258] Generally, if a high tax burden decreases the sales volumes, tax revenues increase at a rate less than proportional to the tax rate and might even decrease with very high tax

[253] See https://health.ec.europa.eu/system/files/2019-07/ev_201906201_co012_en_0.pdf.
[254] KBC Economics, "A sugar tax, does it really work?" (22 Nov. 2017), (accessed: 4 Apr. 2023).
[255] (2018) Relatório do grupo de trabalho (order número 2774/2018). Impacto do imposto especial sobre o consumo de bebidas açucaradas e adicionadas de edulcorantes.
[256] Source: European Commission (National Tax List 10/31/2022); own compilation.
[257] See https://www.pwc.pl/en/articles/sugar-tax.html#:~:text=The%20amount%20of%20sugar%20tax,in%20100%20ml%20of%20beverage.
[258] The non-linear relationship between tax rates and tax revenues originates from a negative impact of the tax rate on the tax base, something which is in line with the policy objectives of SSB taxes. See Annex 3 for the detailed description.

rates. For HFSS taxes, low tax revenues might also be in line with policymakers' interests, reflecting that high tax rates are efficiently reducing consumption and thereby addressing health concerns.[259] Taking into account that not levying an SSB tax is also a policy decision, the non-linear relationship between tax rates and revenues is much clearer if Member States without an SSB tax are also included. Figure 13 illustrates the non-linear relationship between SSB taxes and their revenues and shows that the revenue maximising tax on SSBs for the data sample lies around €18/hl if one includes the countries without taxes in place. Restricting the sample to countries which have a tax on SSBs, the revenue maximising tax rate lies around €23.6/hl.[260]

In other words, the data for 2008 to 2021 seems to suggest that the tax revenue-raising incentive at least co-existed with the health objective when setting the tax rates for taxes on SSBs, i.e., no country set the tax rates so high that consumption declined enough to result in lower tax revenues.[261]

Figure 13: Revenue maximising tax on SSBs



Source: WIFO calculation based on regression output.

Practices regarding the use of HFSS tax revenues also differ between countries. **Earmarking,** or hypothecation of HFSS tax revenues for health and social programmes (e.g. health promotion or NCD-prevention-related activities), is recognised in the literature as a tool to help build wider support or political consensus for HFSS taxes and increase the acceptability of such tax policies by the general public.[262] However, it should be noted that earmarking is a contentious

[259] This is in sharp contrast with taxes on income where being on the downward sloping part of the Laffer curve is never in the interest of the policymakers.
[260] However, one needs to bear in mind that this result presents an average and does not necessarily imply that this tipping point is applicable for each Member States individually.
[261] For a more detailed analysis of the tax revenue potential of SSB taxes in the Member States see country cases studies and appendix.
[262] UNICEF (2021), Policy brief: Sugar- Sweetened Beverage Taxation; K. Lauber, H. Rippin, K. Wickramasinghe, A.B. Gilmore (2022), Corporate political activity in the context of sugar-sweetened beverage tax policy in the WHO European Region; WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets.

topic that goes beyond the specifics of SSB tax earmarking and into the ambit of public financial management, with some arguing against earmarking on the grounds that it introduces rigidities and inefficiencies into budget processes.[263] In the EU, only a few countries earmark tax revenues from HFSS products for specific health programmes, namely **Hungary, Poland and Portugal**. In Poland, 96.5% of the tax revenue is transferred to the National Health Fund, which allocates these funds to educational and preventive activities and to health care services related to the maintenance and improvement of the health of beneficiaries with diseases developed as a result of inappropriate health choices and behaviours, in particular for obesity and those having overweight. In addition, **France** now earmarks these revenues to the social security budget, which includes healthcare.

In **conclusion,** relative to GDP, the **revenues raised from existing HFSS taxes in the EU are relatively modest, with substantial differences across countries** (on average in 2021, they were equal to 0.05% of GDP in the 11 countries with an SSB tax). However, they can still be considered as a positive outcome accompanying the desired health objectives.

Tax revenues effectively generated by HFSS taxes tend to be lower than projected at the time of introduction. **Ex ante assessments do not always precisely capture** the changes in demand, product reformulation or product substitution. This is confirmed by our econometric analysis which shows the existence of a non-linear relationship between tax rates and revenues for SSB taxes in the EU (see Annex III for more information on the results). In particular, if a high tax burden decreases the sales volumes, tax revenues increase at a rate less than proportional to the tax rate and might even decrease with very high tax rates.

2.3.2. Implementation of HFSS taxes and tax non-compliance

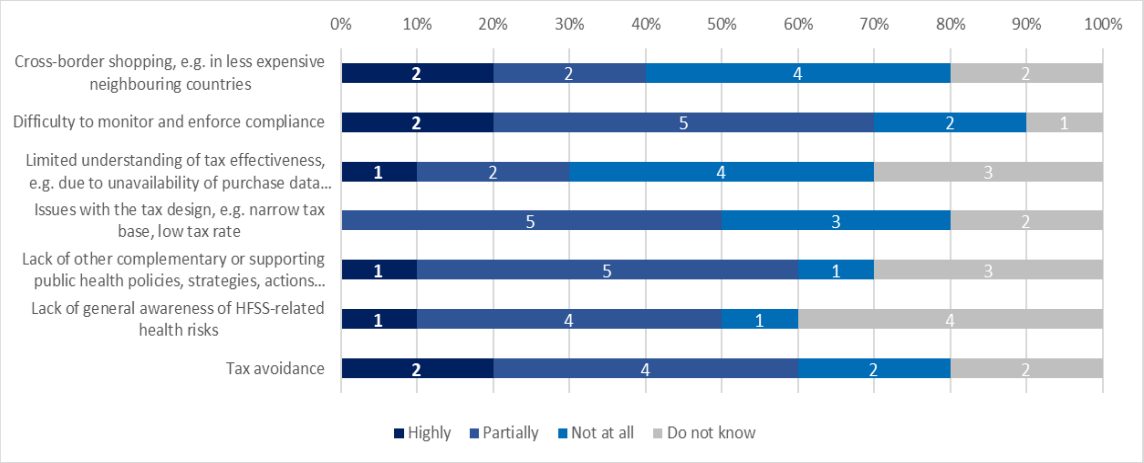
Evidence derived from stakeholder consultation (Figure 14) sheds light on some of the factors which are regarded as limiting the successful implementation of HFSS taxes and their effectiveness.

Some countries indicate that issues with the tax design are a limiting factor (e.g. a low tax rate). This is also reflected in the findings from the literature review conducted in this study which highlight a lack of empirical evidence and/or assessments in some countries on the effectiveness of these taxes and their impacts on various indicators. This aspect was also pointed out during stakeholder interviews, including with WHO representatives, indicating a lack of access to robust data (e.g. on food composition and sales) by governments.

The majority of tax administrations reported the difficulty to monitor and enforce compliance (two "highly" and five "partially"), as well as tax avoidance (two "highly" and four "partially") as limiting factors in the successful implementation of HFSS taxes in their country, although only anecdotal and very limited evidence is provided (mostly related to cross-border shopping) or found in literature for the latter.

[263] WHO (2022), *Health taxes – Policy and Practice*, available here.

Figure 14: Tax authorities' perception of factors limiting the successful implementation of taxes on HFSS products in their country



Source: Tax authorities survey n=10 countries with HFSS tax in place; Question: Do any of the following factors limit the successful implementation of taxes on HFSS products in your country?

Tax non-compliance extends beyond intentional legal tax avoidance or illegal tax fraud/evasion. It also includes non-intentional non-compliance due to lack of or limited tax knowledge. Therefore, whether intentional or not, tax non-compliance reduces tax revenues collected through HFSS taxes. This is a topic which is poorly studied, hence evidence gathered on this subject is fragmented and anecdotal.

According to estimates by the Danish Ministry of Taxation, the illegal cross-border trade of soft drinks in Denmark amounted to 202 million litres from 2010 to 2016.[264] The literature review related to other Member States that introduced HFSS taxes did not discuss tax fraud or evasion as a risk or result of such national taxes and did not even provide any anecdotal evidence.

However, interviews with tax and customs authorities revealed a number of findings. Several interviewees clarified that the monitoring and control of taxable products can be problematic because the Excise Monitoring and Control System (EMCS) does not apply to products that are subject to HFSS taxes and therefore, monitoring of the production, movement, and reception of such products and the levying of excise duties is not carried out in a uniform manner across the single market. At the same time, national approaches to monitoring allow authorities to keep high-risk market players under close observation. Thanks to this, authorities have not yet uncovered significant evidence of irregularities. In addition, it is for the Member States to establish an effective control mechanism for the cross-border movement of goods into their markets.

According to the WHO, levying taxes on HFSS products is more straightforward than on tobacco and alcohol, given that the risks of non-compliance and illicit trade are lower as the incentive for tax evasion is significantly lower (due to the relatively low market price of HFFS products)[265]. The WHO outlines the following steps which

[264] See https://www.regeringen.dk/media/4275/status_over_graensehandel_2017.pdf (Table 2.5) and https://skm.dk/aktuelt/publikationer/rapporter/status-over-graensehandel-2016 (Table 5.6.)

[265] WHO manual on sugar-sweetened beverage taxation policies to promote healthy diets. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO.

constitute tax administration: registration and licensing, tax declaration and recordkeeping, duty suspension and the collection of tax and issuing of refunds.

Registration and licensing ensures that tax authorities are aware of those producing or importing the taxable product. HFSS taxes are often administered on a self-assessment basis. Taxpayers typically need to provide identity, location and bank account information as a minimum. Tax declarations are used to identify taxpayers and are a source of information when determining the determine taxes due. All HFSS taxes in the EU take the form of excise taxes, which means they are typically levied at the point of manufacture or distribution (e.g., SSB taxes can either be collected from manufacturers or from retailers). In EU countries implementing HFSS taxes, tax payments are to be made at fixed intervals of time as defined in the national legislations. The tax and customs administrations are in charge of collecting the excise duties and verifying compliance. Periodic audits and controls are used by authorities to increase compliance (in all EU countries covered by this study, controls also include occasional laboratory testing).

According to the World Bank (2020)[266], single-tier volume-based excise taxes can be more straightforward to implement compared to sugar-content-based or tiered volume-based taxes and can be an efficient way to raise revenue. They thus recommend that jurisdictions with sufficient administrative capacity consider sugar-content-based taxes. Chriqui et al. (2013) find that excise taxes are easier to administer and can lower the likelihood of tax evasion because they are collected directly from manufacturers and distributers.[267]

Limited research is available related to the tax implementation process. Forberger et al. (2022) research implementation processes for SSB taxation worldwide and find that further research on SSB taxation implementation processes is needed to determine whether the aim of the policy and the envisaged outcome are linked in practice.[268] Their research indicates that implementation of HFSS taxes has been examined in depth for only one European country – Portugal.

It is common for the collection of excise duties on imports to remain the responsibility of customs authorities, while the collection of excises on domestic products is the responsibility of tax authorities, while excise and customs authorities may be part of the same organisation. Taking the example of Portugal, we see that production, reception, holding and movement of SSBs in excise duty suspension is only allowed via authorised warehouse keepers, and in/from their respective tax warehouses (either production or storage warehouses); these are always recorded. Specifically, requests for such authorisations must always be formalised, processed and granted locally, by the competent excise office. Receipt of goods in a national territory, originating in a third country, is subject to an import procedure, and the excise duty follows the same rules as those applied to

[266] World-Bank (2020), SSB-Taxes-Evidence-and-Experiences, available at https://thedocs.worldbank.org/en/doc/d9612c480991c5408edca33d54e2028a-0390062021/original/World-Bank-2020-SSB-Taxes-Evidence-and-Experiences.pdf.
[267] Chriqui JF, Chaloupka FJ, Powell LM, Eidson SS. A typology of beverage taxation: multiple approaches for obesity prevention and obesity prevention-related revenue generation. J Public Health Policy. 2013 Aug;34(3):403-23. doi: 10.1057/jphp.2013.17. Epub 2013 May 23. PMID: 23698157; PMCID: PMC3730238.
[268] Forberger, S., Reisch, L., Meshkovska, B. et al. Sugar-sweetened beverage tax implementation processes: results of a scoping review. Health Res Policy Sys 20, 33 (2022). https://doi.org/10.1186/s12961-022-00832-3.

any other duties such as VAT, etc., upon importation (see case studies in Annex I for more information on country-specific tax collection).

2.3.3. Overview of costs and benefits per stakeholder group

While the preceding sections have focused on the different effects that HFSS taxes bring about, this section provides an overview of the costs and benefits arising for the different stakeholder groups, namely competent authorities, economic operators and consumers. This will provide an overview of the various effects presented above but synthesised from the perspective of the three main stakeholder groups directly concerned.

Competent authorities

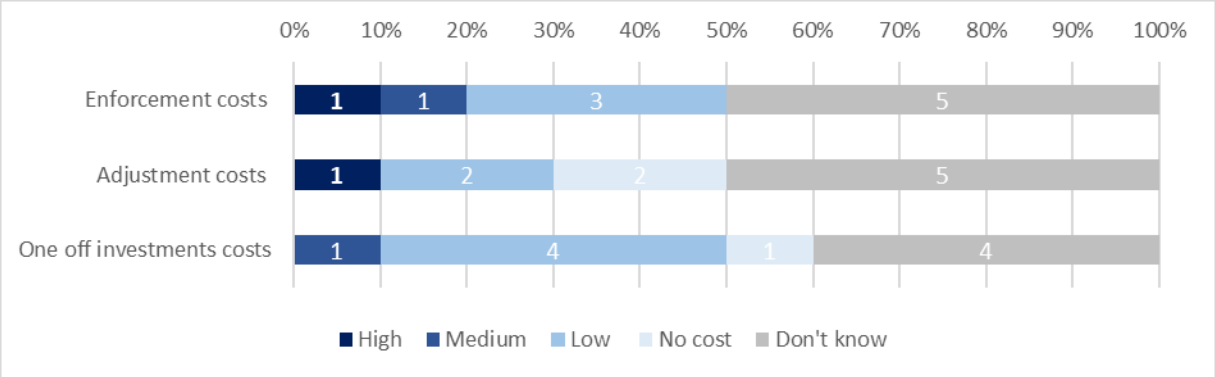
From a tax administration perspective, well-designed HFSS taxes should aim to keep direct costs as low as possible. Costs for administrations may span from one-off investment costs (e.g. new IT equipment, software) to adjustment costs for familiarising themselves with new or amended legislation, as well as recurring staff costs to complete activities required to ensure regulatory compliance, and to monitor and collect the tax. Specific tax designs may also introduce additional layers of administrative complexities, such as SSB taxes based on sugar content which generate the need to determine the sugar content of products and assess tax liability. Generally, in the absence of mandatory labelling regulations, tax authorities may require financial and human resources to independently test the sugar content of taxpayers' SSBs through ad-hoc audit processes[269]. In EU countries where the tax is progressive with regard to sugar content, competent authorities refer to the EU mandatory labelling indicating sugar content of products as a reference used and facilitating calculations on the amount payable by producers[270]. Also, according to the Belgian Customs and Excise Department, there was no administrative burden when introducing the differentiation between the non-sweetened and sweetened beverages into the existing legislation.[271]

Among the tax administrations with HFSS taxes in place who answered the survey, half (five) were not able to provide an assessment of costs (Figure 15). However, the majority of respondents indicate that these costs are mostly negligible, especially one-off investment[272] and adjustment costs[273]. For instance, the Belgian Ministry of Finance stated that non-alcoholic beverages have been subjected to excise duties for a long period and the declaration process is based on the existing declaration process for other excise goods (alcohol, energy products, etc.). Therefore, no separate declaration software needed to be developed for these products.[274] Similarly, the Finnish Ministry of Finance indicated these costs are low, as they were related to adding health guidance to the already existing excise duty on soft drinks[275].

[269] WHO (2022), Manual on sugar-sweetened beverage taxation policies to promote healthy diets.
[270] Representatives of Finance Ministries during workshop.
[271] Interview with Customs and Excise Department, Ministry of Finance Belgium, January 2023.
[272] E.g. new equipment, IT, software etc.
[273] E.g. costs for familiarising with new or amended regulatory obligations, developing compliance strategies, allocating responsibilities for completing compliance-related tasks etc.
[274] Tax authorities survey, Customs and Excise Department, Ministry of Finance Belgium.
[275] Representative from the Ministry of Finance via survey.

Enforcement costs[276] (recurring) were ranked slightly higher, although only two tax authorities indicated these costs to be medium to high. This was also confirmed through interviews, with some authorities indicating negligible costs. However, administrations were not able to provide more granular quantitative data on cost estimates. Some indicated the impossibility of disaggregating the resources deployed exclusively to the enforcement of the HFSS tax, since staff was dedicated to targeting and confronting non-compliance on a wide array of taxed products.

Figure 15: Perception of costs that tax administrations face to ensure compliance with taxation on HFSS products



Source: Tax authorities survey, n=10; Question: How would you rate the following costs (if any) that your administration face(d) to ensure compliance with taxation requirements on HFSS products applicable in your country?

Such costs need to be compared with benefits in the form of tax revenues. Overall, the majority of competent tax administrations (60%, with the remaining 40% being unable to give an assessment) indicated that **tax revenues are considerably higher than enforcement costs** in their countries.

Cross-border shopping can be considered as a revenue leakage for the jurisdiction levying the tax. Such a phenomenon tends to be considered an issue only in smaller jurisdictions, where relatively higher proportions of the population live close to the border, as it is anecdotally reported in Belgium, Denmark and Portugal. However, it is hard to assess the magnitude of such a phenomenon and there is very limited evidence or hard data available. It represents a rather marginal problem for larger countries, where this is not generally reported (see section on *Cross-border shopping* for more details).

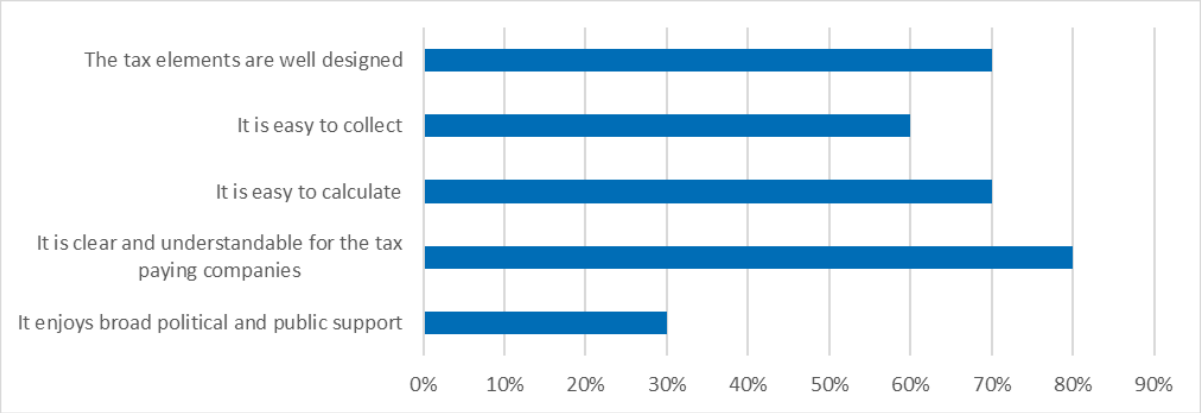
While relatively modest compared to both GDP and total tax revenues, tax revenues from HFSS taxes can still be regarded as a positive outcome alongside the health objective. Overall, among tax administrations consulted for the survey, **60% assessed the effectiveness of the HFSS tax in their country to be satisfactory in relation to the initial fiscal objectives** and 30% deemed it to be partially satisfactory (one did not know).

When asked about the aspects of the HFSS tax that are working well, the majority of tax authorities consulted indicated that the tax is easy to collect (60%) and to calculate (70%), while in their view it is also clear and understandable for the tax

[276] E.g. the costs of staff time devoted to completing the activities required to ensure regulatory compliance, such as collecting and monitoring the tax, document and check forms.

paying companies (Figure 16). Moreover, only two of the ten responding authorities deem it to be expensive for them to collect and/or monitor data on taxable sales, while three also perceived the tax as a high administrative burden for companies in their countries[277].

Figure 16: Tax authorities' perception of HFSS tax aspects that are working well



Source: Survey with tax authorities (n=10). Note: percentages indicate the share of respondents that indicated a specific aspect; Question: In your opinion, what aspects of the HFSS tax are working well?

Economic operators

Various studies show that HFSS taxes have faced strong opposition from the food and beverage industry (both multinational and domestic actors) in many countries, before and after their implementation. A recent meta-analysis examining HFSS taxes in EU countries finds that **industry opposed the tax in all countries based on the expected negative economic impact on businesses**, as well as on employment, or they criticised the effectiveness or design of the tax.[278]

A recent WHO study analysing 11 countries in the WHO European Region which have implemented SSB taxes illustrates that industry expressed their concerns about the potential negative economic effects, either on the overall economy, employment or businesses themselves, and claimed that the policy was unfair or unjustified. However, the **WHO study concludes that no peer-reviewed independent study has shown that SSB taxes harm employment for the food sector**, pointing out that existing evidence is insufficient to determine a causal relationship between SSB taxes and sector growth or changes to employment, with the impact on share values appearing to be minimal[279]. However, **the study highlights that these fiscal measures do generate administrative costs for companies**, although it suggests that these can be minimised with well-designed taxes. For instance, when designing the tax in Portugal, competent authorities were faced with issues experienced by some very small and local operators producing drinks with a very low sugar content, which fell within a lower tier with a tax rate that was still considered disproportionally high and disadvantageous for them. As a consequence, competent authorities

[277] Survey with competent tax authorities (n=10).
[278] A. M. Thow, H. L. Rippin, G. Mulcahy, K. Duffey, K. Wickramasinghe, *Sugar-sweetened beverage taxes in Europe: learning for the future,* available here.
[279] K. Lauber, H. Rippin, K. Wickramasinghe, A. B. Gilmore, Corporate political activity in the context of sugar-sweetened beverage tax policy in the WHO European Region.

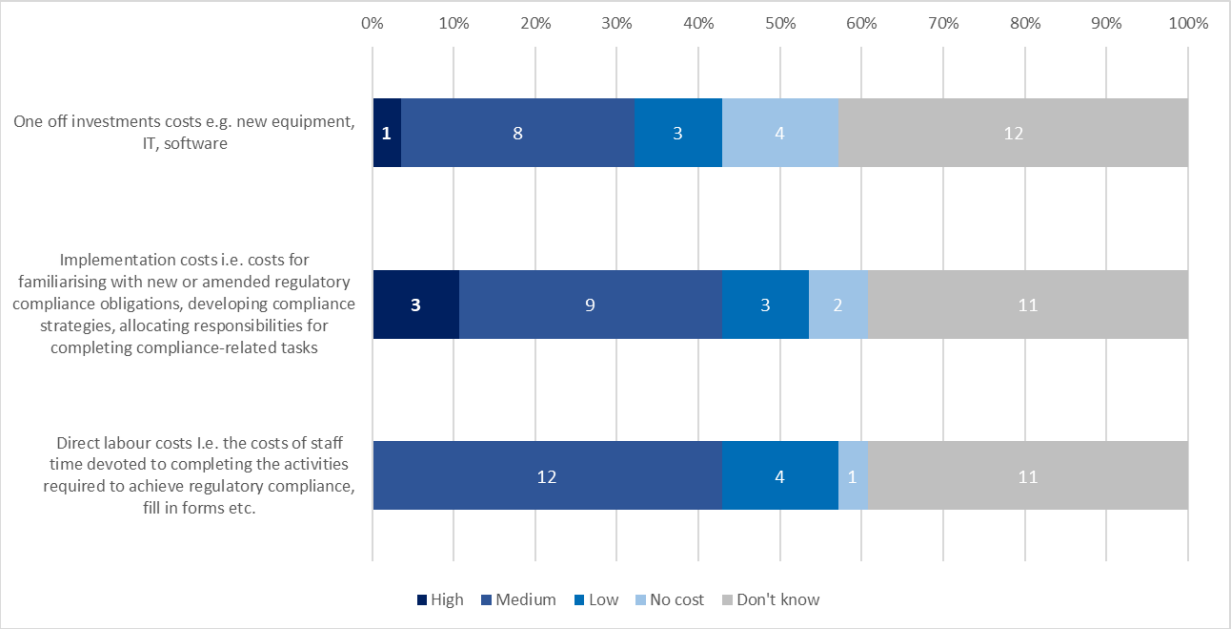
decided to change tiers, in order not to suffocate local businesses[280]. Similarly, other countries (e.g. Finland and Ireland) envisage exemptions for small producers.[281]

Around a third of industry stakeholders consulted during the survey indicated one-off investment costs and implementation costs which resulted in a (medium) cost category for them to ensure compliance with taxation on HFSS products in the countries where they sell these products. Nevertheless, some investment costs are reportedly claimed by industry when rethinking production processes and/or packages of soft drinks (e.g. in the case of product reformulation)[282].

A slightly higher share (43%) indicated that they are facing direct labour costs to comply with administrative activities which is a (medium) cost. A minority of respondents indicated that these costs are high. Anecdotal evidence from stakeholder interviews also suggests that these costs are not particularly high, especially for countries with uniform tax rates not tiered to sugar content (e.g. Belgium), where a lump-sum tax has to be paid (i.e. less burdensome administrative formalities)[283].

[280] Representative from Portuguese Finance Ministry during workshop.
[281] Finland: a release of a maximum of 70,000 litres of beverages for consumption, https://www.vero.fi/yritykset-ja-yhteisot/verot-ja-maksut/valmisteverotus/virvoitusjuomavero/virvoitusjuomien-pienvalmistajat/; Ireland exempts any products excluded from the scope of the EU food labelling Regulation, EU 1169/2011 (Annex V item 19) on the basis of small-scale production, https://www.revenue.ie/en/tax-professionals/tdm/excise/sugar-sweetened-drinks-tax/sugar-sweetened-drinks-tax-general-ssdt-compliance-procedures-manual.pdf.
[282] Industry representatives via interviews.
[283] Interview with Belgian industry association.

Figure 17: Industry perception of costs borne to ensure compliance with taxation on HFSS products applicable in countries where their products are placed

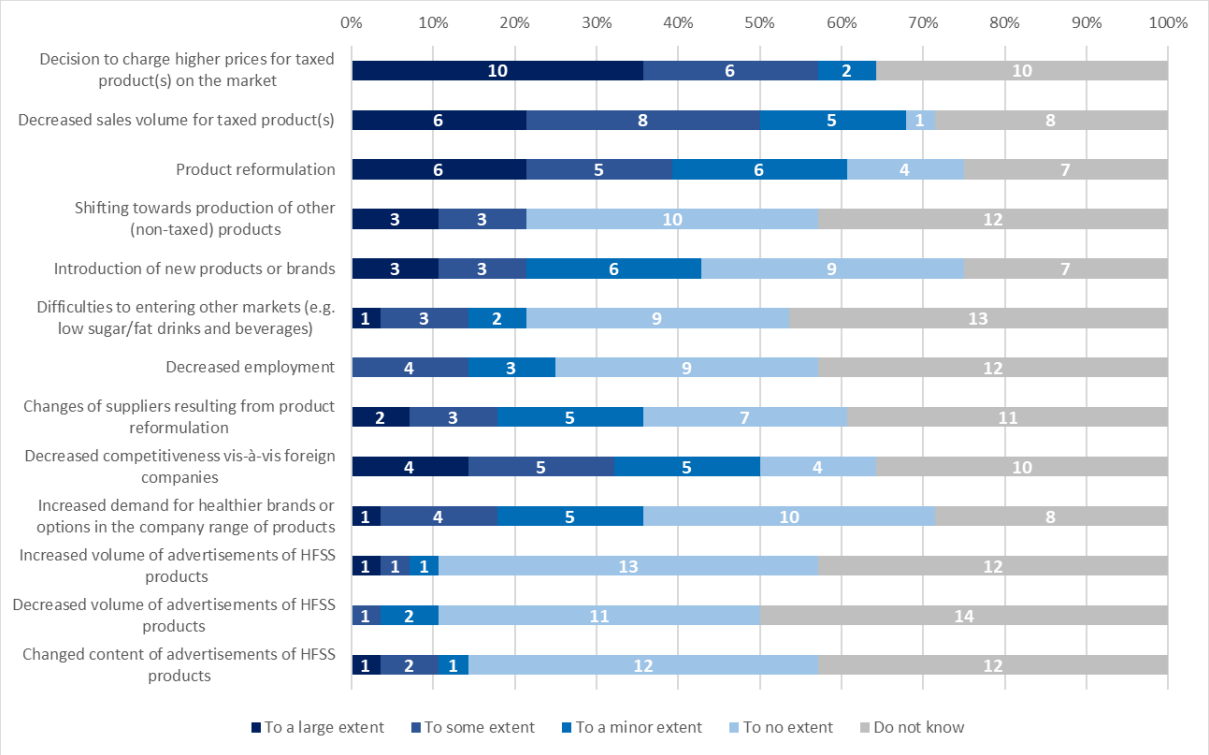


Source: Stakeholder survey with industry associations and individual companies (n=28); Question: How would you rate the following costs (if any) that your company face(d) to ensure compliance with taxation on HFSS products applicable in countries where your products are placed?

One aspect underlined in stakeholder consultations is that one of the main (indirect) cost categories for industry consists of **reduced sales volumes and profitability**. Looking at the effects experienced by industry as a consequence of the introduction of taxes on HFSS products (Figure 18), **half of the respondents reported negative effects on their sales volumes**, to various extents (21% to a large extent, 29% to some extent). However, results show that only **a minority reported negative impacts on their employment levels** (14% to some extent).

Similarly, half of the respondents highlighted some negative effects on their competitiveness vis-à-vis foreign companies, although with considerable variations in terms of the size of these effects: 14% to a large extent, 18% to some extent, 18% to a small extent. Only a minority indicated difficulties when entering other markets, such as low-sugar drinks. As stated above, a major strategic response by industry to mitigate any decrease in sales has been through product reformulation, a response undertaken by the majority of industry respondents (57%), with 40% indicating product reformulation was necessary to a large extent or to some extent (a quarter indicated that they did not know).

Figure 18: Industry perception of the consequences of the introduction of taxes on HFSS products in the countries they operate in



Source: Stakeholder survey with industry associations and individual companies (n=28); Question: To what extent have your company/the companies you represent experienced any of the following as a consequence of the introduction of taxes on HFSS products in the countries you operate in (that is, countries where your company's product is placed on)?

As noted in previous sections, there seems to be a general consensus among various sources regarding the tax pass-through, where typically only a relatively low proportion of the tax burden is absorbed internally by producers. Remarkable exceptions may take place, particularly in localised areas under specific market conditions, as a consequence of contextual market structure (e.g. high competition) and marketing decisions by producers/retailers.

Other potential indirect costs for the industry derive from the distortion of market competition (e.g. through cross-border shopping). As described in previous sections, cross-border shopping tends to affect mostly smaller jurisdictions (e.g. there is some evidence from Denmark and anecdotal information from Belgium). Moreover, 43% of those industry stakeholders consulted believe that SMEs are most affected by discrepancies in HFSS taxes across EU countries (14% disagree, 18% neither agree nor disagree, 25% do not know). In particular, reportedly administrative burdens may be higher if excise taxes apply to a larger number of different consumer products, especially for smaller companies[284].

In **Finland**, for instance, competent authorities reported various cases of state aid complaints filed by the industry[285], based on exemptions made regarding specific product categories considered discriminatory, which led to the repeal of the confectionery tax in 2017[286]. HFSS taxes on food are less widely implemented

[284] Competent authorities during workshop.
[285] Representatives of Finance Ministry brough up the example of ice creams (taxed) and frozen cakes (not taxed).
[286] Library of the Congress (2015), available here.

worldwide and in Europe (only in Hungary and Denmark currently), due also to the technical and administrative challenges associated with delineating the scope of the tax and the products being taxed, which could potentially generate high administrative costs and state aid concerns. Some countries reportedly use Harmonised System (HS) codes and/or CN codes (e.g. Portugal, Finland and Ireland)[287] as a means of identifying the targeted products to be taxed (see Chapter 4 for more details).

Claims of SSB market distortions are also reported by industry. For instance, concerns are raised by industrial stakeholders regarding the different treatment of plant-based dairy alternatives which are taxed at a higher rate compared to dairy in various countries (e.g. the Netherlands and Belgium where milk-based drinks are mostly exempt), despite fortified plant-based alternatives to dairy products reportedly being increasingly featured in authorities' dietary recommendations[288]. This is seen by operators in the market as disadvantageous and discriminatory vis-à-vis consumers as well as plant-based food businesses.

Available evidence varies across countries in terms of costs and effects of HFSS taxes on the industry. WHO evidence from the **UK** found that, although there were some minor daily abnormal stock market returns on the day of the announcement of the SSB tax, share prices quickly returned to normal levels and continued to rise over the following years. Thus, the announcement and implementation of the tax does not appear to have a substantial or long-lasting negative impact on share prices, although companies appeared to have had to invest to change their offers to consumers to mitigate the effects of the tax[289]. Similarly, there is evidence of a statistically significant impact on domestic companies' turnover (−5.6%) in the two-year period between the announcement and implementation (2016–2018), showing a short-term negative impact of the announcement of the tax. These findings suggest that, to a large extent, manufacturers managed to mitigate the negative effects of the tax before it came into effect, with downturns in soft-drink sales likely reflecting inward investment in reformulation and other activities in response to the tax[290].

Empirical evidence from **Hungary** shows strong negative short-term effects of the HFSS products tax on firms' domestic sales volumes, and moderate effects on domestic sales revenue and personnel costs. However, these effects were found to diminish about three years after the introduction of the tax, overlapping with the recovery of the Hungarian economy from recession and suggesting that the impacts of the tax are strongly related to the general economic conditions. In particular, through a difference-in-differences analysis, the study finds that between 2011 and 2016 the food tax caused a decrease in domestic sales revenue of sweet food producers by a statistically insignificant 3%, whereas the negative effect on domestic sales volumes was a significant 26%, suggesting that firms were able to partly shift the tax burden onto consumers[291].

Empirical evidence from **Portugal** finds that the SSB tax impairs SSB producers' financial health, by inducing a 6.8% average decrease in domestic SSB sales.

[287] Representatives of tax authorities during workshop.
[288] Industry representatives via interview.
[289] WHO (2022), *Health taxes – Policy and Practice*, available here.
[290] WHO (2022), *Health taxes – Policy and Practice*, available here.
[291] A. Bíró (2020), The impact of sweet food tax on producers and household spending — Evidence from Hungary.

However, the study shows that SSB producers/importers did not decrease wages, make job cuts, or modify their workforce in favour of higher R&D capacity[292].

Consumers

A recent WHO study analysing EU countries implementing HFSS taxes illustrates that these represent proportionally higher costs for **low-income groups**, as these groups generally tend to spend a higher proportion of their disposable income on food compared with high-income groups[293]. This is also confirmed by own econometric analysis (see Affordability section) – even though we find that consumption of such taxed products does not appear to differ significantly between the various socio-economic groups identified. Nevertheless, most of the consumer organisations/NGOs (67%) consulted during the survey stated that HFSS taxation often particularly affects low-income households (26% neither agree nor disagree, 4% disagree and 4% do not know).

Moreover, as research in previous sections has shown, typically high cost pass-through rates are observed in EU countries, with large parts of these taxes passed on to consumers leading to increased price indices for taxed products. The extent of such price increases depends on various factors, especially the level of tax rates. This is an intended effect of such taxes, which aim to influence consumption behaviour by changing relative prices of taxed products.

At the same time, current research[294] as well as our own research also establishes **that lower-income groups are likely to benefit most from the health impacts of SSB taxes**. Therefore, potential negative distributional effects need to be read in conjunction with the positive health effects induced by the implementation of HFSS taxes. Moreover, in countries where tax revenues are earmarked for social/health initiatives (i.e. Hungary, Poland and Portugal), benefits explicitly materialise for consumers and the general population in the form of funds dedicated to educational and preventive activities and funds for health care services.

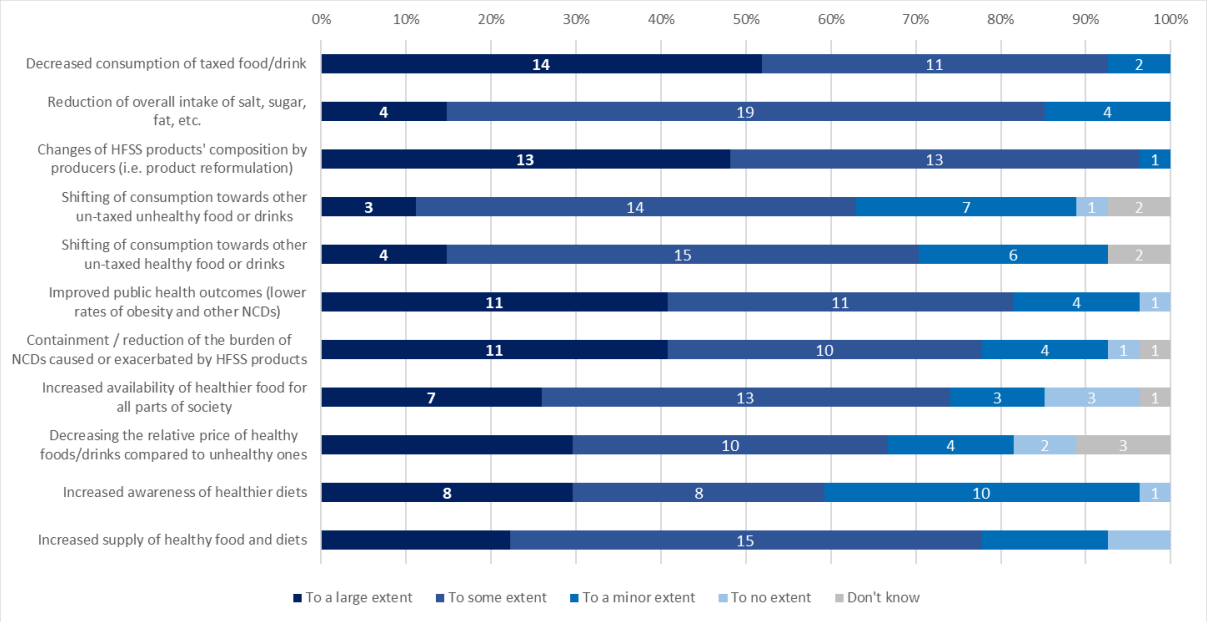
Indirect health benefits may be generated by a reduction in unhealthy food consumption. There is varied evidence on the effectiveness of HFSS taxes in reducing consumption of unhealthy taxed products, as the impact on consumers' behaviour is far from straightforward and there are many variables at play. However, for most EU countries studied, evidence shows that the consumption of taxed SSBs can be reduced in comparison to other drinks if the tax is sufficiently high to trigger behavioural change. Also, in most countries studied, smaller or larger shifts can be observed from taxed to non-taxed products, with consumption increasing typically for (non-taxed) low sugar drinks, fruit drinks and mineral waters.

This is also confirmed by the stakeholders consulted. According to the majority of NGOs and consumer organisations consulted (Figure 19), HFSS taxes can lead to decreased consumption of taxed food (with more than 50% indicating that this is

[292] J. Gonçalves, R. Merenda, J. Pereira dos Santos (2023), *Not So Sweet: Impacts of a Soda Tax on Producers,* available here.
[293] K. Lauber, H. Rippin, K. Wickramasinghe, A. B. Gilmore, Corporate political activity in the context of sugar-sweetened beverage tax policy in the WHO European Region.
[294] K. Lauber, H. Rippin, K. Wickramasinghe, A. B. Gilmore, Corporate political activity in the context of sugar-sweetened beverage tax policy in the WHO European Region.

true to a large extent) and drinks and product reformulation by producers (roughly 50% to a large extent), resulting in public health benefits such as the reduction/containment of the burden of NCDs caused or exacerbated by HFSS products. At the same time, HFSS taxes alone are limited in their ability to shift consumption towards other (untaxed) healthy products and to increase sufficiently the price of unhealthy food so that the relative price of healthy food would be lower.

Figure 19: Stakeholder perception of the impacts of HFSS taxes on products



Source: Survey with NGOs and consumer organisations (n=27); Question: In your opinion, to what extent do taxes on HFSS products have the following impacts?

As mentioned in previous sections of the report, in contrast to the shorter-term outcomes of HFSS taxes, the evidence on longer-term impacts of HFSS taxation on population health is not as robust, as there is a lack of specific observational evidence on the effects of HFSS taxes on health. Evidence on the health effects of these taxes comes mainly from simulation studies. The evidence from these modelling studies (including own modelling estimates) indicates that HFSS taxes have the potential to improve population health, but more empirical/observational research would be needed in this field, as the link is not sufficiently proven.

The table below summarises the costs and benefits identified for affected stakeholders.

Table 4: Overview of costs and benefits

	National administrations	Economic operators	Consumers/wider society
Direct costs:			
i) Regulatory charges	• n/a	• Cost on economic operators in the form of specific excise duties to be paid. • Typically high rate of cost pass-through, in the region of 70% and >100%, with variations across countries. • Typically, relatively low proportions of the tax are absorbed internally by producers, despite a lag effect sometimes being observed. • Remarkable exceptions possibly taking place in localised areas under specific market conditions.	• Taxes passed through to consumers to a large extent, leading to increased price indices for taxed products. • Intended effect of such taxes: aim to influence consumption behaviour by changing relative prices of taxed products.
ii) Administrative and adjustment costs	• Half (five) of the authorities consulted during the survey were unable to assess these costs. • The majority of authorities responding indicated these costs to be low or negligible. • Low costs particularly true for countries with existing legislation already in place: i) L:ess administrative burdens for amending existing legislation. ii) No separate declaration software needed. • Some countries reportedly used existing Harmonised System (HS) codes and/or CN codes as a means of identifying the targeted products to be taxed. • Taxes on HFSS foods typically present more technical and administrative challenges (e.g. delineating the scope), potentially generating higher administrative costs.	• Stakeholders consulted typically did not indicate particularly high costs. • Over a third were not able to assess these costs. • About a third indicated one-off investments and adjustment costs as a (medium) cost category. • Some investment costs are reportedly claimed when rethinking production processes and/or packages for soft drinks. • Slightly higher proportion (43%) indicated that they are facing direct labour costs to comply with administrative activities (a medium cost). • Anecdotal evidence from interviews indicated that costs were not particularly high, particularly for countries with uniform tax rates not tiered to sugar content, where a lump-sum tax has to be paid (i.e. less burdensome administrative formalities).	n/a
iii) Enforcement costs	• Enforcement costs not identified as being particularly burdensome (only two authorities indicate that these costs are medium-high). • Interviews confirmed mostly negligible costs. • Administrations unable to provide more granular estimates.	n/a	n/a

	National administrations	Economic operators	Consumers/wider society
	• Where the tax is proportional to sugar content, some authorities pointed out the use of mandatory labelling as a reference used and it helped to facilitate calculations on the amount due.		
Indirect costs	n/a	• Indirect costs for industry in the form of reduced sales volume and profitability to varying degrees, depending amongst others on the price elasticity and substitution patterns. • Available evidence in some countries shows strong negative short-run effects on firms' domestic sales volume and revenue. However, in some countries these effects were found to diminish with time. • Evidence of cross-border shopping in smaller jurisdictions. It is a rather marginal problem for larger countries. • Hard to assess the magnitude of cross-border shopping as there is very limited evidence and hard data available. • Some stakeholders indicated SMEs are being disproportionately affected by discrepancies in taxes structures (especially tax rates) across EU countries. • No evidence found on negative impacts on employment levels.	• In most Member States, the share of household income spent on SSBs decreases with income. • Changes in consumption patterns prompted by HFSS taxes also tend to deliver higher health benefits to low-income groups. • Evidence from the case studies shows that additional expenditures per household can be considered modest.
Non-market benefits **(health)**	• Health-economic estimates indicate a substantial economic burden of NCDs in Europe, highlighting the potential health benefits and changes in health care costs associated with a reduction in body mass index (BMI) for example. • The impact on potential health care cost reductions is currently understudied.	n/a	• Health benefits can be achieved through reduced consumption of unhealthy taxed products and/or product reformulation. • There is evidence in some countries product reformulation is a consequence of introducing HFSS taxes. While a correlation is observed, the causality link remains more complex to demonstrate. • The consumption of taxed SSBs has decreased in comparison to other drinks in some Member States.

	National administrations	Economic operators	Consumers/wider society
			• Some shifting to healthier products (product substitution) can be observed. • Evidence on longer-term impacts of HFSS taxation on population health is not robust enough. It is necessary to observe the effects over a longer period. • General lack of specific observational evidence on the effects of SSB taxes on health. • Evidence on the health effects originates mainly from simulation studies, indicating that SSB taxes have the potential to improve population health. • Available (limited) empirical evidence also identified positive health impacts.
Revenue generation **(fiscal)**	• Revenue typically represents a modest proportion of GDP and overall tax revenue, with wide variations due to the different scope of taxes across Europe. • The more the tax reduces the consumption of the taxed goods or induces product reformulation, the less it can contribute to revenue generation and vice versa. • 60% of tax authorities (six) indicated the effectiveness of the HFSS tax in their country to be satisfactory in relation to the initial fiscal objectives, 30% (three) indicated it was3) partially satisfactory. • Tax revenues can still be regarded as a positive outcome alongside the health objective.	n/a	• Indirect benefits can be generated for consumers/wider society, by earmarking tax revenues for social/health initiatives (i.e. Hungary, Poland and Portugal).

3. OPPORTUNITY FOR AN EU APPROACH

3.1. Harmonisation of taxation as a means to achieve EU objectives

3.1.1. Harmonisation of taxes at EU level

Harmonisation of taxes by the EU is **governed by Article 113 TFEU** that foresees a special legislative procedure requiring unanimity in the Council, after consultation with the European Parliament and the European Economic and Social Committee. In addition, the EU can legislate to harmonise indirect taxes (to which HFSS taxes belong) only if such harmonisation is necessary to ensure the **establishment and the functioning of the internal market and to avoid distortion of competition**. While the Court of Justice of the EU (CJEU) has not yet interpreted these prerequisites for harmonisation in Article 113 TFEU,[295] it has done so for the prerequisite "establishment and functioning of the internal market" in the context of a similar provision of **Article 114 TFEU on direct taxes**. This interpretation can be seen as an indicator for a potential harmonisation of indirect taxes. The CJEU clarified that the necessity to ensure "establishment and functioning of the internal market" means that there are obstacles to trade or "it is likely that such obstacles will emerge in future because the Member States have taken or are about to take divergent measures with respect to a product or a class of products such as to ensure different levels of protection and thereby prevent the product or products concerned from moving freely within the Community".[296] In addition, in other case law, the CJEU has recognised the protection and improvement of public health as a valid steering policy objective in the context of tax harmonisation.[297]

EU harmonisation measures can take the form of minimum or maximum (full) harmonisation.[298] Minimum harmonisation sets minimum standards that do not preclude Member States from adopting more stringent or exacting national rules, provided the latter are compatible with the EU Treaties.[299] By contrast, maximum harmonisation provides exhaustive standards for the entire domain establishing common standards and preventing Member States from deviating from them in national legislation.

In the context of tax harmonisation, the EU can choose what type of harmonisation it wants to pursue based on principles of subsidiarity and proportionality and what is suitable politically and economically.[300] For instance, minimum harmonisation may include the definition of the minimum tax rate at the EU level, while Member States can adopt a higher tax rate. For the purpose of this study, three scenarios of HFSS tax harmonisation are developed and described in Sections 4.1 and 4.2.1. An additional consideration for HFSS tax harmonisation is that, because existing HFSS taxes are indirect taxes at national level (see Section 2.1.3.), a

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[295] Jørgensen, C.W., Terkilsen, L.K. (2022). Article 113 [Harmonisation of Indirect Taxes]. In: Springer Commentaries on International and European Law. Springer, Cham. DOI: https://doi.org/10.1007/16559_2022_43

[296] Case C-434/02, Arnold André, 2004, ECR I-11825, ECLI:EU:C:2004:800, para. 34.

[297] Case C-210/03 Swedish Match, 2004, I-11893, ECLI:EU:C:2004:802, esp. para. 56.

298 Some scholars also distinguish partial, vertical and horizontal harmonisation: Klamert, Marcus (2015). What We Talk About When We Talk About Harmonisation. Cambridge Yearbook of European Legal Studies, 17, 360-379. doi:10.1017/cel.2015.12. These forms will not be further discussed in this study as not relevant for the analysis.

[299] Paul Craig and Gráinne de Búrca (2011). EU Law : Text, Cases, and Materials, 5th edition, p. 600.

300 There is no obligation to minimum harmonisation in the EU Treaties, and the case law of the CJEU is not consistent on the matter. Also, over time, the trends of maximum harmonisation and minimum harmonisation alternated. See the analysis by Weatherill, Stephen (2020), The Fundamental Question of Minimum or Maximum Harmonisation, in: S Garben and I Govaere (eds), The Internal Market 2.0, Oxford : Hart Publishing, 2020., Available at SSRN : https://ssrn.com/abstract=3660372.

harmonisation of HFSS taxes at EU level raise the question of the potential implications for the monitoring of cross border movements. Considering the lack of evidence for tax fraud or tax evasion related to HFSS products (see chapter 2.3.3), it could be argued that the fiscal risk for HFSS is limited. Therefore, it would be advisable to design the minimum requirements that would be necessary for securing the proper functioning of the internal market (including indications of taxable events, time and place of chargeability, collection of taxes and their reimbursement) without inducing an unnecessary administrative burden, both for tax administrations and economic operators, such as a declaratory system following national practises. Alternatively, exemptions for HFSS products to specific provisions of the existing Directive on General Arrangements[301]could be considered. This Directive applies currently to excise goods, i.e. energy products and electricity, alcohol and alcoholic beverages and manufactured tobacco.

3.1.2. Achieving EU objectives through tax harmonisation

While national HFSS taxes produce some desirable effects such as product reformulation by producers and changes in consumption (see Chapter 2) and thus achieve the declared national policy objectives, the heterogeneity of HFSS taxes in Europe could result in undesirable effects on the internal market. In particular, the following three undesirable effects (or problems) of divergent national HFSS taxes could constitute obstacles to the establishment and functioning of the internal market and distort competition:

- **Market fragmentation**: If only some Member States introduce HFSS taxes, companies operating in different countries (and thus, in different national markets) are confronted with differing market conditions (i.e., a fragmented market) – and thus do not benefit from a 'level playing field'. Companies could be subject to considerable divergences in tax reporting that are reflected in different compliance costs, which can affect smaller producers to a greater extent than big companies (e.g. reporting on sugar content upon production or import of products). We find that these costs differ per Member State as they are dependent on the monitoring and enforcement rules.

- **Cross-border shopping**: If only some Member States introduce HFSS taxes, consumers may start shopping in neighbouring countries without such taxes to acquire HFSS products. While we find limited evidence of this phenomenon being spread over Europe, it does affect certain (smaller) jurisdictions, such as Belgium, Denmark and Portugal. Thus, cross-border shopping may undermine the intended effects of the national tax both in reaching its fiscal and health objectives.

- **Fraudulent activities**: These can take place in the form of retailers or wholesale traders buying products across the border and selling them in the concerned market without making the correct tax declaration. Such practices are possible due to limited monitoring and control over cross-border trade for these product categories.

[301] Council Directive (EU) 2020/262 of 19 December 2019 laying down the general arrangements for excise duty (recast), available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32020L0262

The above undesirable effects can be translated into needs that could be addressed by EU action such as minimum harmonisation at the EU level. At the same time, positive effects of national taxes (i.e., changes in consumer behaviour and product reformulation as well as the resulting improvement in public health) could be magnified by EU-level action. Based on these considerations, the needs which must be addressed by EU-level action include:

- **Containment of market fragmentation**: Minimum harmonisation at EU level would reduce the disparities between the national tax rules, thus levelling the playing field. From the perspective of the stakeholders surveyed for this study, this objective can be achieved by using minimum harmonising measures in the area of HFSS taxes – 43% of the stakeholders agreed or strongly agreed that some degree of harmonisation of HFSS taxes would improve the level playing field, while 25% were of the opposite opinion.

- **Increase of tax revenue**: As mentioned above, minimum harmonisation of HFSS taxes at EU level will require Member States to introduce or expand such taxes. As a result, a new revenue stream for the state budget would be created. Minimum harmonisation would also provide the possibility of implementing a control system at EU level that could also help national authorities tackle tax fraud and avoidance.

- **Improvement of public health**: Minimum harmonisation of HFSS tax at EU level would lead Member States with no HSFF taxation to introduce national HFSS taxes. Some of the Member States may adopt a bolder approach to HFSS taxes as the risk of cross-border shopping would be reduced if minimum harmonisation is in place. Depending on their design, HFSS taxes are likely to lead to a shift in consumer choices towards healthy food and drinks low in HFSS because the producers will be encouraged to reformulate their recipes or develop new products that are not subject to the HFSS tax and, therefore, may be cheaper and more popular with consumers. Tax harmonisation at EU level would also send a stronger signal to consumers and companies raising awareness of the intentions and importance of such HFSS taxes for public health. In this way, HFSS taxes would also incentivise consumers to purchase healthier food and drinks, potentially positively impacting public health outcomes across the Union .

The magnitude of the benefits of harmonisation are dependent on the level of harmonisation implemented. Chapter 4 outlines three separate scenarios for the harmonisation of SSB taxes at EU level and discusses potential benefits and their magnitude in terms of health outcomes and tax revenues.

3.2. A harmonised EU HFSS tax and wider EU policies

A potential harmonised EU HFSS tax needs to be consistent with relevant EU policies and priorities. This means it needs to be relevant, aligned and synergistic with them, complement and strengthen them, but not be redundant nor contradictory. Sections 3.2.1. to 3.2.4. map and briefly describe the relevant EU policies and legislation focusing only on those that are currently in place. After this, Section 3.2.5. assesses the consistency of a potential harmonised EU HFSS tax with health-related policies. Section 3.2.5. does not analyse the coherence of a potential harmonised EU HFSS tax as it provides a merely hypothetical discussion

and not an analysis of policy options. Section 3.2.6. also discusses potential implications of harmonising a HFSS tax for State aid.

3.2.1. Main umbrella policies for public health

Two main EU-level policies for public health play an overarching role in other EU efforts. The **Europe's Beating Cancer Plan** launched in early 2021 is a key pillar of a European Health Union and aims to mobilise EU action to tackle cancer throughout the entire disease pathway.[302] The Beating Cancer Plan supports EU Member States in achieving the UN Sustainable Development Goals, in particular Target 3.4 to reduce premature mortality from NCDs by one third by 2030. Among its actions are "saving lives through sustainable cancer prevention", which includes promoting healthy diets through exploring tax incentives to increase consumption of healthy diets and decrease the consumption of sugars and soft drinks. The plan also mentions revising the EU School Fruit, Vegetables and Milk Scheme, proposing mandatory front-of-pack nutrition labelling, and the Audiovisual Media Services Directive (AVMSD). Furthermore, the European Commission states their support for Member States and stakeholders in the reformulation of unhealthy food products and the reduction of their marketing through the Joint Action Best ReMaP. The Beating Cancer Plan discusses the role of taxation in supporting public health promotion and commits the European Commission to explore the feasibility of proposing new tax measures on sugars and soft drinks, of which HFSS tax harmonisation can be one.

Secondly, the **Healthier together – EU non-communicable diseases (NCDs) initiative** for 2022-2027 aims to support Member States in the identification and implementation of effective policies to reduce the NCD burden.[303] This initiative is stated to be complementary to Europe's Beating Cancer Plan. In regard to nutrition, among other actions, it mentions the promotion of food reformulation, development of comparable public procurement standards based on nutrition guidelines, improvement of coherence with fiscal policies, promotion of the reduction of portion sizes, and the implementation of a nutrient profile model. Furthermore, coordinated approaches should be developed to frame advertising of HFSS foods (e.g. through social media) and promote healthier choices (e.g. by nudging, but also through taxation) more effectively.

Other relevant EU policies and legislation can be grouped into two categories based on the objectives they aim to achieve: 1) to encourage the production and consumption of healthy food and drink and 2) to restrict the production and marketing of unhealthy food and drink.

3.2.2. Promotion of the production and consumption of healthy food and drink

There are several specific EU policies aiming (inter alia) at the promotion of the production and consumption of healthy food and drink.

The **EU Farm to Fork Strategy**[304] for a fair, healthy and environmentally friendly food system aims to increase the availability and affordability of healthy, sustainable food options and promote sustainable food consumption to facilitate

[302] European Commission (2021), Europe's Beating Cancer Plan, COM (2021) 44, 03.02.2021.
[303] European Commission (2022), Healthier together – EU non-communicable diseases initiative, guidance document.
[304] European Commission (2020). A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system, COM(2020) 381 final of 20.05.2020.

the shift to healthy, sustainable diets. The provision of clear information will empower consumers to make informed, healthy and sustainable food choices. The Strategy also foresees tax incentives, such as special VAT rates to support organic fruit and vegetables. As part of the Farm to Fork Strategy, a framework for sustainable food labelling and harmonised mandatory front-of-pack nutrition labelling will be proposed to encourage consumers to make healthy food choices.[305]

The **EU School Fruit, Vegetables and Milk Scheme**[306] was launched in 2017 to support the distribution of fresh milk, fruit, vegetables and products thereof to schoolchildren in preschools as well as primary and secondary schools to promote healthy eating habits. The specific product lists are approved by Member States, but no products with added sugar, salt, fat and sweeteners or artificial flavours are allowed in general, though Member States may allow some limited quantities of them as an exception. We note that some of the fruit and milk products may be subject to HFSS taxation in some Member States (see Section 2.1.3.). The scheme also supports educational measures related to healthy eating habits and lifestyles. As announced in the Farm to Fork Strategy, the EU school scheme is currently under review to enhance its contribution to sustainable food consumption and in particular to strengthen educational messages on the importance of healthy nutrition, sustainable food production and reducing food waste.

The **European Child Guarantee**[307] of 2021 seeks to ensure healthy and sustainable nutrition for all EU children, especially those in need. It recommends Member States provide "at least one healthy meal each school day", support "effective access to healthy nutrition" outside school days, ensure appropriate nutrition standards for children and provide adequate information to children and families on healthy nutrition. Member States should develop relevant national plans to this effect.

The EU **Joint Action Best-ReMaP**[308] for 2020-2023 also aimed to improve the quality of menus in public institutions (especially schools, kindergartens and hospitals) and assure the transparent quality of food procured via public procurement procedures. The Joint Action scheme also supported Member States by sharing best practices related to food reformulation and developed and implemented a European Standardised Monitoring System for the reformulation of processed food in 18 EU Member States. The project prioritised five processed food categories (bread products, breakfast cereals, delicatessen meats, dairy products, and soft drinks) due to their major contribution to HFSS intake by children, developed a methodology for data collection and analysis and established a common data nomenclature. This made it possible to collect comparable data on branded food and drink products and assess nutritional quality evolution.[309]

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[305] European Commission (n.d.). Legislative framework for sustainable food systems: https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy/legislative-framework_en; European Commission (2021). Sustainable food system framework initiative, Ares(2021)5902055: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13174-Sustainable-EU-food-system-new-initiative_en.

[306] Article 5 and Annex I of the Council Regulation (EU) No 1370/2013 of 16 December 2013 determining measures on fixing certain aids and refunds related to the common organisation of the markets in agricultural products, OJ L 346 of 20.12.2013; Commission Implementing Regulation (EU) 2017/39 of 3 November 2016 on rules for the application of Regulation (EU) No 1308/2013 of the European Parliament and of the Council with regard to Union aid for the supply of fruit and vegetables, bananas and milk in educational establishments, OJ L 5 0f 10.01.2017; Commission Delegated Regulation (EU) 2017/40 of 3 November 2016 supplementing Regulation (EU) No 1308/2013 of the European Parliament and of the Council with regard to Union aid for the supply of fruit and vegetables, bananas and milk in educational establishments and amending Commission Delegated Regulation (EU) No 907/2014, OJ L 5 of 10.01.2017.

[307] Council Recommendation (EU) 2021/1004 of 14 June 2021 establishing a European Child Guarantee, OJ L 223 of 22.06.2021.

[308] See official website Best-ReMaP.

[309] The results of the project can be found under Best-ReMap (n.d.). Processed Food Monitoring and Reformulation: https://bestremap.eu/monitoring/.

The **Regulation on nutrition and health claims made on foods**[310] is the legal framework used by food business operators when they want to highlight the particular beneficial effects of their products in relation to health and nutrition, on the product label or in its advertising. The rules of the Regulation apply to nutrition claims (such as "reduced sugars", "with no added sugars", "sugar-free", "low fat", "high fibre") and to health claims (such as "Vitamin D is needed for the normal growth and development of bones in children"). The objective of those rules is to ensure that any claim made on a food's labelling, presentation or advertising in the EU is clear, accurate and based on scientific evidence.

The **Regulation on food information to consumers**[311] establishes the general principles, requirements and responsibilities governing food information, and in particular food labelling. It lays down the means to guarantee the right of consumers to information and procedures for the provision of food information, including fair information practices to ensure that the labelling, advertising and presentation of food does not mislead consumers. The Regulation requires the vast majority of pre-packaged foods to bear a mandatory nutrition declaration to allow consumers to make informed and health-conscious choices. The nutrition declaration provides the energy value and the amounts of sugars, carbohydrates, fat, fatty acids, protein and salt in the food. This declaration can be complemented by a voluntary repetition of its main elements in the principal field of vision (known as the 'front-of-pack') to help consumers see at a glance the essential nutrition information when purchasing foods. Several Member States have also adopted voluntary front-of-pack nutrition labelling schemes[312] (e.g. Keyhole, NutrInform Battery or Nutri-Score) which may also affect consumers' behaviour. A review of the Regulation on Food Information to Consumers including harmonised mandatory front-of-pack nutrition labelling, announced in the Farm to Fork Strategy, is ongoing.[313] The Regulation on food information to consumers is being revised as part of the Farm to Fork Strategy and in order to ensure alignment with Europe's Beating Cancer Plan.[314]

3.2.3. Restrictions on marketing of unhealthy food and drink

A harmonised HFSS tax could be a policy instrument that acts in synergy with marketing restrictions on unhealthy food and drinks, providing a coherent signal to consumers. Also, restrictions on the marketing of unhealthy food and drink limit the ability of economic operators to employ advertising and marketing strategies to compensate for a potential loss in their market share due to HFSS taxes,[315] hence supporting the effectiveness of HFSS tax policies.

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[310] Regulation (EC) No 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods, OJ L 404 of 30.12.2006.

[311] Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004, OJ L 304 of 22.11.2011.

[312] European Commission (2020). Report regarding the use of additional forms of expression and presentation of the nutrition Declaration, COM(2020) 207, 20.05.2020.

[313] European Parliament, Legislative Train Schedule, 'Proposal for a harmonised mandatory front-of-pack nutrition labelling" (Accessed 15 May 2023).

[314] The information on the revision can be found at European Commission (n.d.). Proposal for a revision of the Regulation on Food Information to Consumers (FIC): https://food.ec.europa.eu/safety/labelling-and-nutrition/food-information-consumers-legislation/proposal-revision-regulation-fic_en.

[315] A toolkit related to marketing of food products was developed by the JRC, see Grammatikaki, E., Sarasa Renedo, A., Maragkoudakis, P., Wollgast, J. and Louro Caldeira, S., Marketing of food, non-alcoholic, and alcoholic beverages. A toolkit to support the development and update of codes of conduct., EUR 30015 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-14174-7, doi:10.2760/20329, JRC118874.

The **Audiovisual Media Services Directive**[316] (AVMSD) requires Member States to ensure that audiovisual commercial communications do not "encourage behaviour prejudicial to health" (Article 9 (1) (c) (iii) AVMSD). Furthermore, it promotes the use of self- and co-regulation regarding the advertising of unhealthy food and drink to children. The self-regulation should take the form of "codes of conduct regarding inappropriate audiovisual commercial communications, accompanying or included in children's programmes, of food and beverages containing nutrients and substances with a nutritional or physiological effect, in particular those such as fat, trans-fatty acids, salt/sodium and sugars, excessive intakes of which in the overall diet are not recommended". The objective of such codes would be a reduction in the exposure of children to the audiovisual commercial communications of such food and beverages (Article 9 (4) AVMSD).

Within the EU Farm to Fork Strategy, the **EU Code of Conduct for responsible food business and marketing practices**[317] was launched on 5 July 2021. Among the seven aspirational objectives with each comprising a plethora of commitments, the signatories of the Code should apply responsible food marketing and advertising practices, e.g. by adhering to self- and co-regulatory initiatives and standards. In this context, the self-regulatory measure **EU Pledge**[318] based on the AVMSD and launched in 2007 as part of the EU platform for Action on Diet, Physical Activity and Health is relevant, which was renewed under the Code.

The Joint Action **Best-ReMaP** mentioned above also aimed to reduce the impact of marketing of unhealthy food on children. The Joint Action studied best practices of food marketing codes in practice in various countries and helped Member States implement them most effectively into their national policies. It also developed an EU coordinated Nutrient Profile Model[319] based on the work of the WHO to identify foods which are not allowed to be marketed to children and adolescents.

The **European Child Guarantee** of 2021 mentioned above also recommends Member States limit advertisements and restrict the availability of HFSS foods in early childhood education such as in care and educational establishments.

3.2.4. Relevant agricultural policies

The **common agricultural policy (CAP)**[320] for 2023-2027 is a common policy for all EU Member States that aims to promote a sustainable and competitive agricultural sector. Its goal is to support the livelihoods of farmers and provide healthy, sustainable food for society. Funding at the EU level is allocated through two structural funds. The European Agricultural Guarantee Fund (EAGF) provides income support to EU farmers, ensuring a secure supply of safe, healthy, and affordable food. The European Agricultural Fund for Rural Development (EAFRD) finances the rural development programmes of Member States. In the context of the latter, the Regulation on the common organisation of the markets in

[316] Directive 2010/13/EU of the European Parliament and of the Council of 10 March 2010 on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services, OJ L 95 of 15.04.2010.
[317] EU Code of Conduct for responsible food business and marketing practices, July 2021.
[318] See the official website of the EU Pledge. The EU Pledge covers advertising on TV, radio, in printed media, cinema, on the internet (company or third party-owned websites and influencer marketing), as well as direct marketing including SMS, product placement, interactive games and mobile marketing. The commitments of the EU Pledge include not to advertise in programmes with an audience of at least 30% children aged up to 13 years. Another relevant commitment is not to advertise food and drinks in such programmes if they do not fulfil EU Pledge common nutrition criteria (which set food category-specific energy caps and maximum limits for salt, saturated fat and sugar).
[319] WHO Regional Office for Europe nutrient profile model: second edition, WHO/EURO:2023-6894-46660-68492, 2023.
[320] European Union (n.d.), 'Common agricultural policy (CAP)', available here https://eur-lex.europa.eu/EN/legal-content/glossary/common-agricultural-policy-cap.html.

agricultural products is relevant in the context of HFSS taxes as it impacts sugar production. It must be pointed out that the impact of sugar-based taxes on domestic sugar production is not clear because this topic is understudied.[321]

The **Regulation on the common organisation of the markets in agricultural products**[322] serves as a safety net for agricultural markets. Its objectives are to enhance market stability and transparency, thereby preventing market crises, improving production and investment decisions, and increasing productivity and quality at the production level. Through this Regulation, the EU also aims to promote cooperation within the food supply chain while establishing minimum quality requirements for both the production process and the products themselves. Furthermore, the Regulation delineates rules governing market intervention within the internal market and trade with non-EU countries. Within the common market organisation, the **EU sugar market**[323] holds significant importance, accounting for approximately 50% of the global beet sugar supply. Producers receive support through two distinct avenues: either in the form of largely segregated direct payments or through voluntary support from Member States, particularly directed towards sectors facing difficulties.

3.2.5. Consistency of a harmonised HFSS tax with other EU policies

As is evident from the list of the relevant EU-level measures in Sections 3.2.1. to 3.2.4., the EU has been actively working on the improvement of public health outcomes in relation to NCDs and specifically diseases related to the consumption of HFSS products for many years. Aiming to change behaviours of all actors involved, EU-level measures adopted so far address both the production and consumption side. Experts[324] observe that, in general, HFSS tax measures are complementary to other measures aiming to raise awareness among consumers, change their behaviours and persuade producers to reformulate recipes to increase the offer of healthier products.

Indeed, a potential harmonised EU HFSS tax would pursue the same objectives as other EU health policy measures listed above (i.e. coherence of objectives is ensured). In particular**, the objective to improve public health in the EU is completely coherent with the objectives of other measures**.

The objectives related to streamlining national frameworks and reducing associated administrative burdens are **fully in line with the overall EU objective of the creation of the internal market** (Article 3 (3) TEU).[325]

In addition to these objectives, the EU harmonised HFSS tax would also pursue a specific **fiscal objective, namely increasing tax revenue**, the magnitude of which would depend on levels chosen and would potentially remain relatively small.

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[321] Kate L Mandeville, Oleg Nivievskyi, Roman Neyter, Pavlo Martyshev, Volodymyr Vakhitov, Bethany Warren, Olena Doroshenko, Impact of a sugar-sweetened beverage tax on sugar producers in Ukraine, European Journal of Public Health, Volume 33, Issue 4, August 2023, Pages 665–667, https://doi.org/10.1093/eurpub/ckad083.

[322] Regulation (EU) No 1308/2013 establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No 922/72, (EEC) No 234/79, (EC) No 1037/2001 and (EC) No 1234/2007.

[323] European Commission (n.d.), 'Agriculture and rural development: Sugar', available here https://agriculture.ec.europa.eu/farming/crop-productions-and-plant-based-products/sugar_en.

[324] Ilona van den Eijnde (2022). A sugar tax in the Netherlands; could that even work? Erasmus University Rotterdam blog.

[325] Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union Consolidated version of the Treaty on European Union Consolidated version of the Treaty on the Functioning of the European Union Protocols Annexes to the Treaty on the Functioning of the European Union Declarations annexed to the Final Act of the Intergovernmental Conference which adopted the Treaty of Lisbon, signed on 13 December 2007, OJ C 202, 07.06.2016.

The minimum harmonisation of HFSS taxes at EU level is **unlikely to duplicate or overlap with any of the existing measures** because there are no other equivalent measures in place. As is clear from the list of the other relevant policy measures above, none of the existing measures are of a fiscal nature or have a bearing on taxation (i.e. they do not determine any elements of tax or trigger tax obligations or exemptions). Rather, a minimum HFSS tax harmonisation can be considered as complementary to the existing measures, most of which are policy initiatives. HFSS tax harmonisation can be considered as a specific legislative measure implementing or supporting these policy initiatives. In particular, it can be said to support the implementation of the EU NCD initiative that foresees an improvement in coherence with fiscal policies, and the EU Farm to Fork Strategy that discusses potential fiscal measures.

Therefore, an EU-level HFSS tax harmonisation would support the existing policy measures as it would **provide an additional incentive to Member States to introduce HFSS taxes**, and it would send a signal to companies to start reformulating and to consumers to switch to healthier products.

3.2.6. EU State aid rules

A potential harmonisation of national HFSS taxes also needs to be considered in relation to the EU State aid rules. In the past, a few national tax measures related to HFSS products were subjected to the State aid assessment by DG COMP.[326] In particular, the example of the Irish SSB tax is instructive. The tax aimed to tackle obesity and other sugar-related diseases while respecting other health objectives and applied to soft drinks containing added sugar with a sugar content of 5 grams or more per 100 millilitres. The State aid assessment by the European Commission concluded that the tax was coherent with its health objectives and that products not subject to the SSB tax were in a different situation than taxed products in light of these health objectives. Therefore, the SSB tax did not contain derogations that would constitute State aid. For example, it was found that soft drinks can be treated differently from sugary solid food because they are the main source of calories devoid of any nutritional value and also more likely than other products to lead to overconsumption which raises certain health issues and risks.

In light of the above, some representatives of national tax authorities suggested within the stakeholder consultations that the lack of clarity about the compatibility of national HFSS tax measures with EU State aid rules may be an obstacle for the introduction of such taxes in more countries.[327] The academic literature also suggests that the threat of invoking the EU State aid rules is sometimes used by companies opposing national HFSS taxation.[328]

However, a thorough analysis of the EU State aid law in relation to national taxation leads to the conclusion that minimum harmonisation is unlikely to eliminate the risk of application of State aid rules to HFSS taxes. The prohibition of Article 107 (1) TFEU (i.e. State aid) applies to tax measures if they grant an economic advantage to certain undertakings or the production of certain goods. In

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[326] For example, State Aid SA.45862 (2018/N) – Ireland: Irish tax on Sugar Sweetened Drinks; see also the reports on the Finish confectionery tax scrapped in 2017 in BBC (2015). Finland: Tax on sweets and ice cream scrapped.

[327] Anne Marie Thow, Holly L Rippin, Georgina Mulcahy, Keeva Duffey, Kremlin Wickramasinghe, Sugar-sweetened beverage taxes in Europe: learning for the future, European Journal of Public Health, Volume 32, Issue 2, April 2022, Pages 273–280, https://doi.org/10.1093/eurpub/ckab211.

[328] Lauber K, Rippin H, Wickramasinghe K, Gilmore AB. Corporate political activity in the context of sugar-sweetened beverage tax policy in the WHO European Region. Eur J Public Health. 2022 Oct 3;32(5):786-793. doi: 10.1093/eurpub/ckac117. PMID: 36099153; PMCID: PMC9527967.

relation to taxation, this covers situations in which specific undertakings are relieved of the costs that other comparable undertakings normally have to bear in the same jurisdiction (e.g. reduction of the amount of tax, exemptions or tax credits).[329] A measure cannot constitute State aid if it is not imputable to a Member State because Member States are under an obligation to implement it under Union law without any discretion, i.e. in the case of full harmonisation of the tax.[330] However, if Member States retain the discretion e.g. to exclude products from the harmonised scope of taxable products or (groups of) undertakings from the tax obligation, in the context of minimum harmonisation, for instance, this may constitute State aid if those products or undertakings are in a similar situation (in light of the stated objective of the tax) as products and undertakings subject to the tax.

3.3. Added value of EU-level tax harmonisation and the potential of alternative initiatives

3.3.1. Desirability of EU-level measures

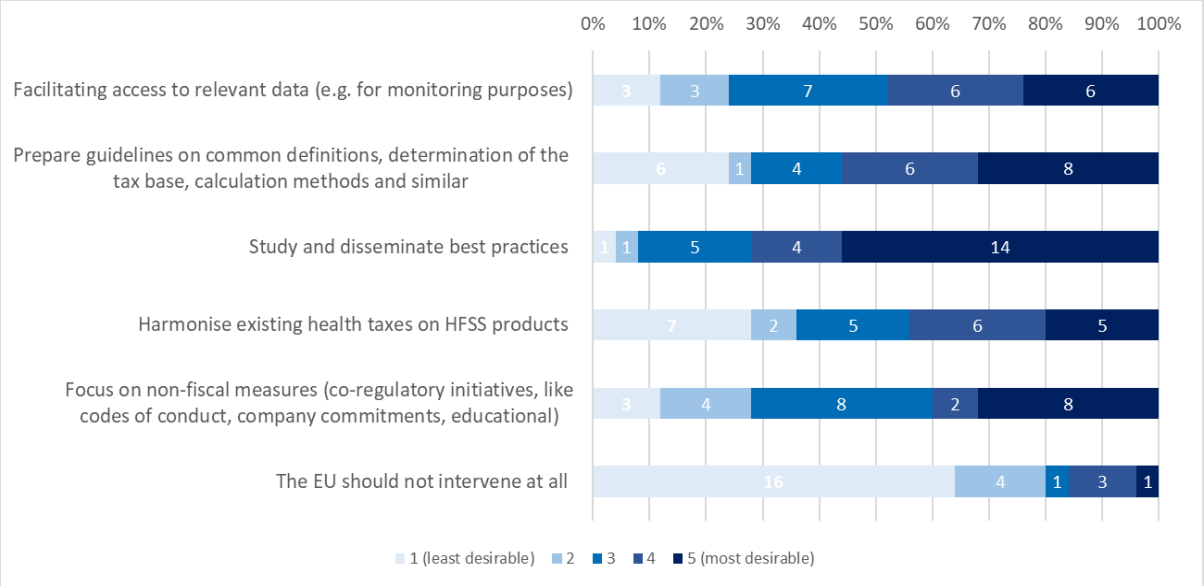
This section discusses how desirable EU-level harmonisation of national HFSS taxes is from the perspective of stakeholders, especially in comparison to other potential measures. The desirability of tax harmonisation is indicative of the political will that is necessary for an EU action under Article 113 TFEU. During the stakeholder consultation for this study, the consulted tax authorities were asked what the most desirable or useful EU-level actions would be. Figure 20 highlights that **most of the consulted tax authorities think that the EU needs to do something**; only a small number of respondents thought that the EU should not intervene at all.

The most desirable or useful EU action on HFSS taxes according to national tax authorities would be conducting relevant studies and disseminating best practices regarding national HFSS taxes. The following two actions are ranked second: **guidelines on the design elements of HFSS taxes** (e.g. common definitions, calculation methods and definition of the tax base) and **various non-fiscal measures** (e.g. encouraging co-regulation and self-regulation). **Harmonisation of HFSS taxes is ranked in fourth place regarding its desirability or usefulness.** Among the aspects of HFSS taxation that would benefit from a certain degree of harmonisation across countries, most respondents indicated that **common definitions, types of products and common nutrient profile models for taxation** would benefit.

[329] State Aid SA.45862 (2018/N) – Ireland: Irish tax on Sugar Sweetened Drinks, para. 17; Repasi, René (n.d.), EU State Aid law and Taxes, pp. 2-3; Lovdahl Gormsen, L. (2019). Chapter 1: Introduction. In European State Aid and Tax Rulings. Cheltenham, UK: Edward Elgar Publishing: https://doi.org/10.4337/9781788972093.00008; Hofmann, Herwig and Micheau, Claire., 2016, State aid law of the European Union, Oxford University Press, pp. 139-149.

[330] §44 of the Commission Notice on the notion of State aid as referred to in Article 107(1) TFEU, C(2016) 2946, OJ C 262, 19.7.2016.

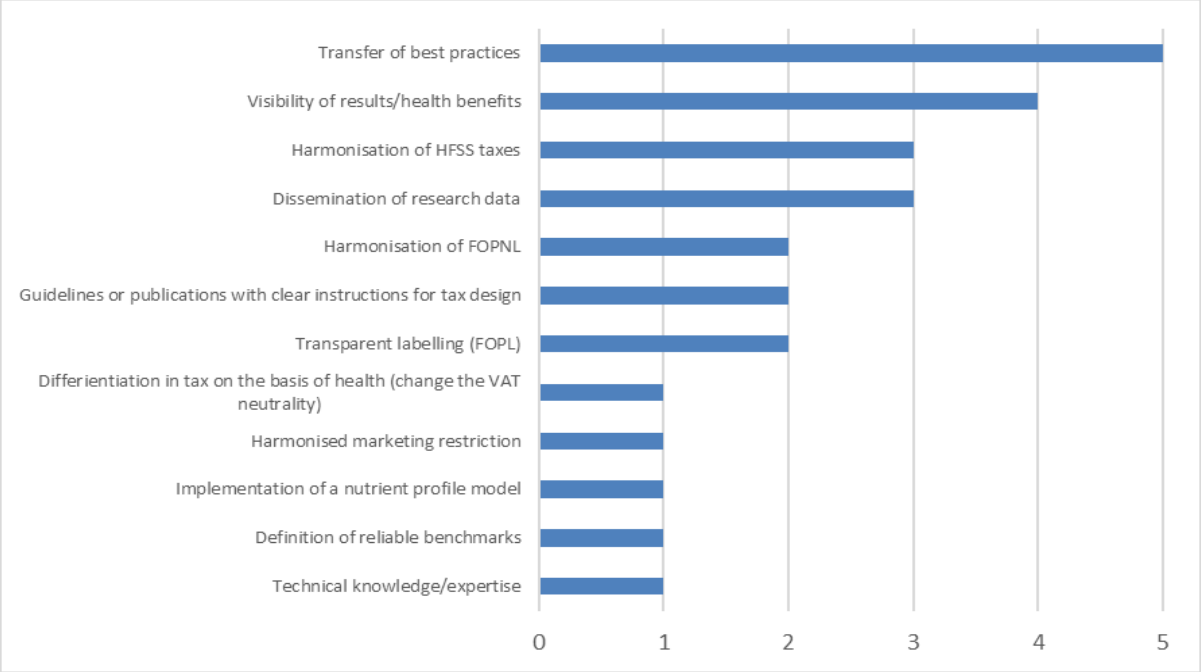
Figure 20: The most desirable or useful action at EU level in the area of HFSS taxes according to national tax authorities (from the least desirable action (1) to the most desirable action (5)



Source: Stakeholder survey with tax authorities (n=25).

A similar question was put to health authorities, and from the 14 responses received, only three mentioned HFSS tax harmonisation (see Figure 21). Other responses included: the exchange of best practices, visibility of results and health benefits of taxes, dissemination of relevant research, transparent labelling and various guidelines.

Figure 21: The most desirable or useful actions at EU level in the area of HFSS taxes according to national health authorities



Note: Health authorities were asked an open ended question and could name any measures they considered desirable or useful.

Source: Stakeholder survey with health authorities (n=14).

3.3.2. *Perceptions of the added value of EU-level HFSS tax harmonisation*

The desirability of HFSS tax harmonisation is linked to the varied views of stakeholders on the perceived added value of a potential EU-level minimum HFSS tax harmonisation. The differences in views on the matter could mainly result from the uncertainty about what such harmonisation would look like and from differences in national tax systems and HFSS taxes, respectively.

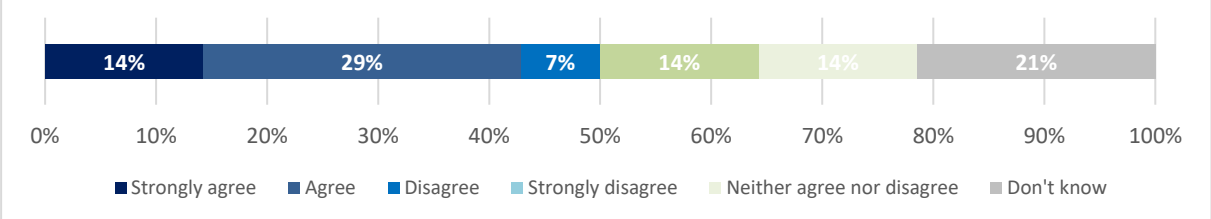
Some stakeholders pointed out that the added value of the EU-level minimum harmonisation would lead those Member States that do not yet have HFSS taxes to introduce it . EU-level harmonisation provides for a blueprint on how to introduce an HFSS tax.

Tax avoidance or fraud was perceived as a problem by some (Chapter 2.3.3), but the discussion about a possible preventive effect of a harmonised tax did not lead to common results. Some representatives of tax authorities think that the harmonisation of tax rates in particular would reduce the incentive for tax fraud. Other consulted stakeholders argued that tax fraud prevention as a result of an EU-level minimum harmonisation of HFSS taxes is unlikely if no monitoring and control system (e.g. Excise Movement and Control System (EMCS) or a version thereof) were to be introduced for this tax. EU Member States where a large percentage of trade takes place with neighbouring non-EU countries do not think that EU-level harmonisation would contribute to tax fraud prevention because HFSS harmonisation would not apply to such third countries.

It is also unlikely that a minimum HFSS tax harmonisation will result in greater certainty for Member States in terms of the **application of State aid rules** to their tax measures. Minimum harmonisation by definition means that some discretion in the tax design is left to Member States. For example, minimum harmonisation of the scope of taxable products would allow them to also include some product categories while leaving others exempted from the scope. Such exemptions would be considered imputable to Member States and may constitute prohibited State aid if providing unjust advantages to certain companies. Hence, the risk remains that Member States' HFSS tax measures may not comply with State aid rules (as discussed in Section 3.2.6).

Consulted companies saw some added value in a potential EU-level harmonisation of HFSS taxes. Regarding the consulted companies, 47% of them agree or strongly agree that some degree of EU-level harmonisation of HFSS taxes would **improve the level playing** field in terms of the scope, exemptions and the like (see Figure 22).

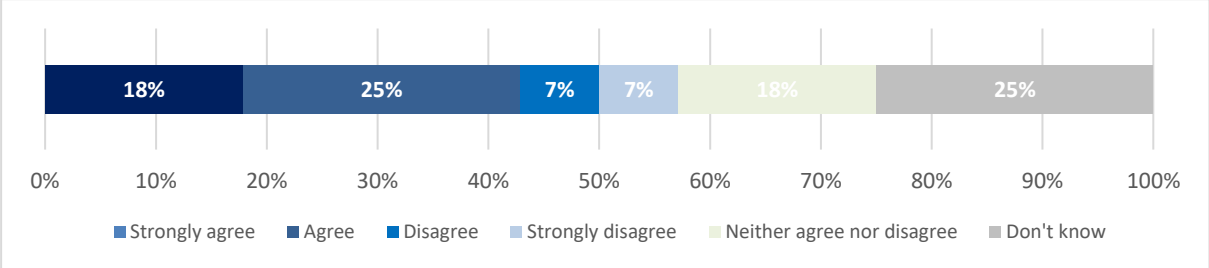
Figure 22: Having some degree of harmonisation of HFSS taxes in the EU would improve the level playing field across EU companies (e.g. on the types of products taxed and exemptions)



Source: Stakeholder survey with companies (n=28).

However, it is not clear whether a minimum harmonised HFSS tax is perceived as potentially resulting in more or less of an **administrative burden** for companies. On the one hand, 43% of consulted companies agree or strongly agree that in particular, SMEs are affected by discrepancies in national HFSS tax systems (Figure 23). Hence, any reduction in discrepancies in national tax systems should be beneficial for them by lowering administrative costs. In particular, EU harmonisation would make it simpler for these companies to navigate tax requirements across Member States. Companies that are trading EU-wide should also benefit from a lower burden of tax compliance due to the harmonisation. On the other hand, a minimum harmonisation will not fully eliminate national discrepancies. In addition, due to a HFSS tax harmonisation, countries that currently do not have HFSS taxes would have to introduce a new tax, which may result in additional regulatory charges, administrative and adjustment costs..

Figure 23: Small and medium-sized companies are affected most by discrepancies in HFSS tax structures (e.g. rates) applied across the EU



Source: Stakeholder survey with companies (n=28).

3.3.3. Other potential EU-level measures to achieve public health objectives

Public health objectives could be achieved with the help of other EU-level actions, ranging from restricting marketing and advertising of HFSS products to self-regulation by companies to reformulate recipes. Such other measures may not represent full alternatives to minimum HFSS tax harmonisation in the sense that – due to their nature – they might not be able to address all identified problems and needs or address them to the same extent as a minimum tax harmonisation measure. Hence, such measures may not be as effective as HFSS tax harmonisation.

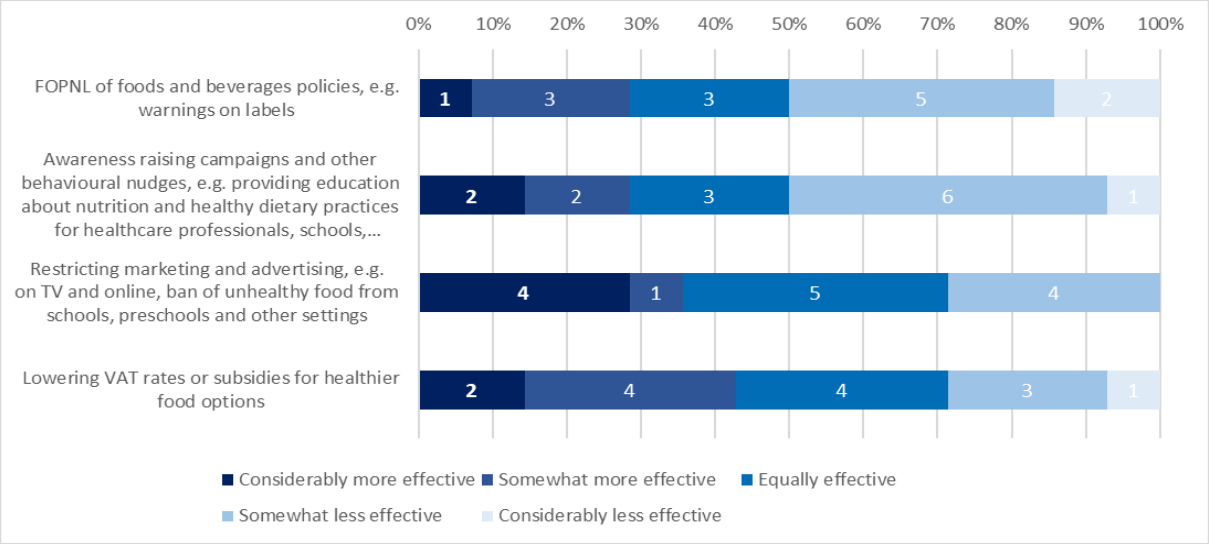
The EU Food-EPI expert panel examined EU-level policies that directly or indirectly (potentially) influence food environments and assesses the impact of EU-level policies and infrastructure on promoting healthy food environments[331]. The panel recognises that food environments influence population diets in EU Member States. Accordingly, the panel recommended a set of five priority actions, which include: mandatory food composition targets for added sugars, salt, and saturated fat for all food categories; a legislated ban on trans fats on all processed and ultra-processed foods; a VAT exemption of 0% on fresh fruits and vegetables to encourage healthy food choices; restrictions or bans on the (online) marketing of

[331] Djojosoeparto SK, Kamphuis CBM, Vandevijvere S, Harrington JM, Poelman MP, JPI-HDHL Policy Evaluation Network. The Healthy Food Environment Policy Index (Food-EPI): European Union. An assessment of EU-level policies influencing food environments and priority actions to create healthy food environments in the EU. Utrecht, Utrecht University, The Netherlands, 2021.

HFSS products to children and adolescents up to 19 years old and bans on food packages for marketing HFSS products to children and adolescents up to 19 years old.[332]

The stakeholders selected for this study were consulted regarding which measures they considered more effective than HFSS taxes. Restrictions or bans on marketing and advertising of unhealthy food were considered by health and tax authorities as well as by NGOs to be one of the most effective measures (see Figure 24 and Figure 26) In addition, more than 30% of health authorities think that making healthy food cheaper is a better course of action than making unhealthy food more expensive.

Figure 24: Other more effective measures than excise duties to reduce consumption of HFSS products – according to health authorities

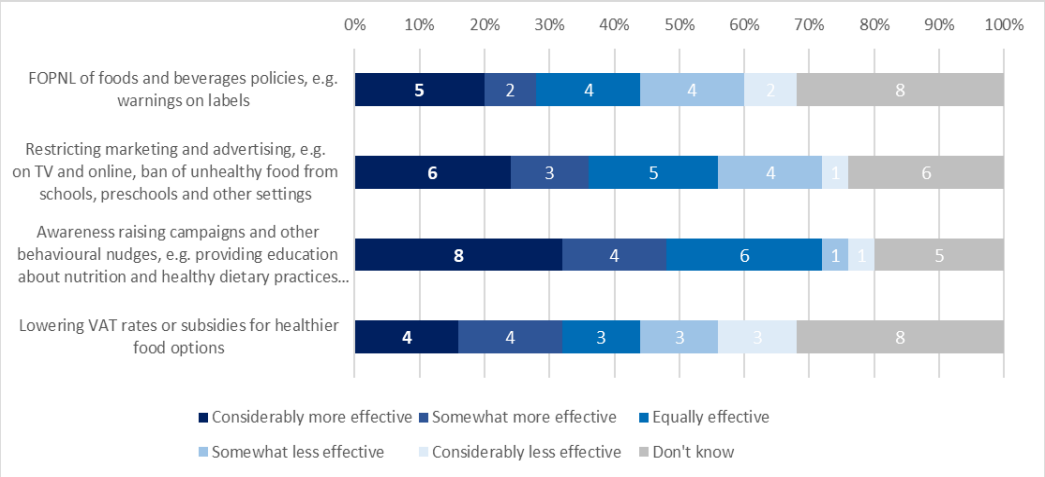


Source: Stakeholder survey with health authorities (n=14). Note for instance, "considerably less effective" means that the option displayed in the table is considered considerably less effective than HFSS taxes.

Tax authorities think that awareness raising, educational and behavioural measures are more effective than HFSS taxes (Figure 25).

[332] Ibid., p. 7.

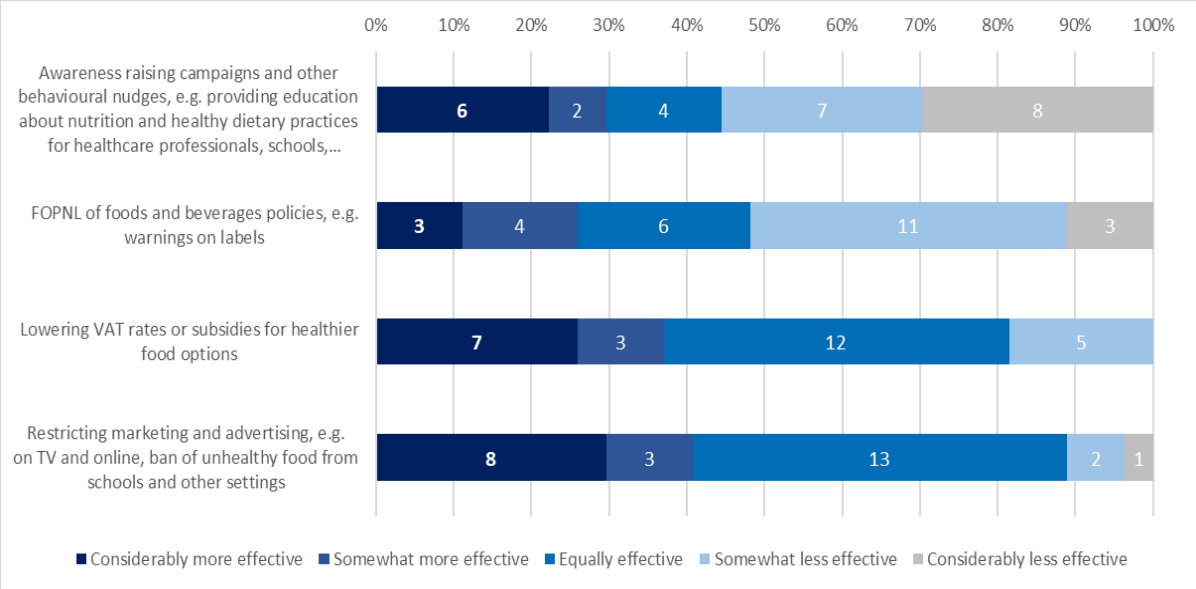
Figure 25: Other more effective measures than excise duties to reduce consumption of HFSS products – according to tax authorities



Source: Stakeholder survey with tax authorities (n=25). Note for instance, "considerably less effective" means that the option displayed in the table is considered considerably less effective than HFSS taxes.

Also, a majority of the consulted NGOs and consumer organisations considered that making healthy alternatives cheaper is more effective than HFSS taxes (Figure 26).

Figure 26: Assessment of effectiveness of policy interventions aimed at containing NCDs caused or exacerbated by HFSS products – according to NGOs and consumer organisations



Source: Stakeholder survey with NGOs and consumer organisations (n=27). Note for instance, "considerably less effective" means that the option displayed in the table is considered considerably less effective than HFSS taxes.

Based on the opinions of stakeholders and the literature review, the sections below discuss various measures that are potential alternatives to HFSS tax harmonisation at EU level.

VAT-related measures

The current VAT Directive[333] allows Member States to apply reduced tax rates for foodstuffs including beverages, but excluding alcoholic beverages (Annex III to the VAT Directive).[334] The scope of the exclusion could be extended by the EU legislators to cover beverages containing a defined amount of sugar or added sugar.[335] In the same vein, food containing amounts of sugar above a predefined threshold could be excluded as well. This would mean that sugary food and beverages could not benefit from reduced VAT rates across the EU. However, the definition (delineation) of products that could fall under such an exclusion would be a challenging task.

Another possibility that could be implemented alternatively or simultaneously to HFSS taxes is imposing a reduced, very low VAT rate (e.g. a special 0% rate) only for (certain types of) healthy foodstuffs, making such reduced rates applicable in all countries.[336] At the moment, the VAT Directive leaves the decision about the reduced rates at the Member States' discretion. For example, Spain has implemented temporary reduced VAT rates for food, inter alia vegetables, fruit and dairy and Germany is discussing zero rates for fruit and vegetables. Since the revision of the VAT Directive in 2022, it is possible to completely exempt goods that are considered basic needs, such as food. The foodstuffs that are considered healthy and on which a super-reduced or zero rate could be imposed should be precisely defined in the Annex III to the VAT Directive, for instance as non-processed fruit and vegetables without added sugar.

One more variant can be conceived mirroring the previous option, namely that the VAT Directive is amended to prohibit reduced VAT rates for unhealthy foodstuffs, while reduced rates remain possible for healthy foodstuffs. Also in this case, the Annex III to the VAT Directive would need to delineate precisely which foodstuffs the reduced VAT rate may or may not apply to (e.g. non-processed fruit and vegetables without added sugar versus processed food).

Despite their common appeal, a range of issues and difficulties arise from such VAT-related measures. Firstly, several challenges in policy preparation and policy design need to be addressed: any changes to the VAT Directive will **require long and difficult negotiations between Member States** and a unanimous decision by them. Hence, they pose similar challenges to HFSS harmonisation measures as they require Member States to come to an agreement. If reduced VAT rates are optional and hence imputable to the Member State, **potential State aid issues arise**, as discussed in Section 3.2.6. In particular, the **delineation of products** to which special reduced VAT rates should (not) apply would pose considerable challenges. The recently published Dutch study on this topic also points to serious concerns regarding the **fiscal neutrality principle.**[337] **The study concludes that**

[333] Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax, OJ L 347 of 11.12.2006.
[334] It shall be noted that Member States may still apply reduced VAT rates to alcoholic beverages sold in restaurant service (Annex III point 12a to the VAT Directive).
[335] Violeta Ruiz Almendral (2018). If sugar is considered the new tobacco, do we have a strong case for increasing the price of added sugar or is it time to rethink food taxes altogether? Blog LawAhead.
[336] See also para. 101 of European Parliament resolution of 20 October 2021 on a farm to fork strategy for a fair, healthy and environmentally-friendly food system (2020/2260(INI)), OJ C 184 of 05.05.2022.
[337] Fiscal neutrality principle is a special case of application of the equal treatment principle of the primary EU law to the common system of VAT. This principle precludes treating similar goods, which are in competition with each other, differently for VAT purposes. It follows that products competing with each other must be subject to a uniform tax rate. See, in particular, Judgment of 10 April 2008, Marks & Spencer plc v Commissioners of Customs and Excise, C-309/06, ECLI:EU:C:2008:211, paras. 45-54.

a health tax (excise duty on SSB's) could be a more promising route forward.[338]

Secondly, concerns exist about the **limited effectiveness of VAT rate reductions**. Empirical evidence regarding the effects of reduced VAT rates is scarce but has been growing in the last few years due to an increasing number of variations in (standard or reduced) VAT rates to counter the various recent crises or to achieve specific policy goals. The existing empirical evidence includes a broad range of pass-through rates due to VAT rate variations.[339] It also suggests that pass-through rates differ between different categories of goods or services. Generally, **VAT pass-through rates are lower for reduced compared to standard VAT rates**, which limits the effectiveness of VAT rate reductions in strengthening financial incentives to buy healthy food. Moreover, existing studies point to asymmetric effects of VAT changes, with the pass-through of rate reductions being lower than that of rate increases.[340]

Research on the effects of VAT rate reductions on food specifically is even more sparse. The results of the few existing empirical studies range between full pass-through or even over-shifting on the one hand and no shift of VAT reductions into consumer prices on the other hand, whereby most analyses lie in between, finding **only a partial pass-through**. Bernal (2018) shows that a small reduction of the Polish reduced VAT rate on basic foodstuffs from 7% to 5% had no effect on prices.[341] For the temporary VAT reduction in Latvia, where the standard rate of 21% was decreased to 5% for fresh fruit and vegetables for a period of three years in 2018, Nipers et al. (2019) estimate a pass-through rate of 88% for the first year after the decrease. Given that this reduction was temporary, the high pass-through rate may have been driven by hopes to convince lawmakers that the measure should be made permanent. For earlier VAT rate changes in Latvia, Benkovskis and Fadejeva (2014) identify higher pass-through rates for goods, and particularly for food, than for services.[342] For VAT changes in Hungary from 2016 to 2017, Ván and Olah (2017) identify differing pass-through rates for different kinds of food.[343] According to the analysis by Gaarder (2018), the replacement of the standard VAT rate on food of 24% by a reduced rate of 12% in Norway is fully shifted to consumers.[344] For Czechia, David (2012) even finds over-shifting for a VAT rate increase by 4 percentage points on foodstuffs.[345]

For any given incomplete pass-through the outcome for reduced VAT rates is less desirable than for HFSS taxes. Incomplete pass-through of a reduced VAT rate increases profits for producers or retailers at the expense of public budgets. In contrast, incomplete HFSS tax pass-through reduces the profit margins of

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[338] Various possibilities of definition were assessed for the Dutch market and Dutch legal system by Michiel Bijlsma, Wouter Vermeulen, Adam Kuczynski, Joeri Athmer, Astrid Lensink, Demi Beernink, Nils Verheuvel, Henk Vording and Jeroen Bijl (2023). Een btw-nultarief voor groente en fruit: Voor- en nadelen van mogelijke afbakeningsvarianten, studie in opdracht van het Ministerie van Financiën en het Ministerie van Volksgezondheid, Welzijn en Sport.

[339] Benedek, D., Mooij, R.A., and Wingender, P. (2015) 'Estimating VAT pass through', *IMF Working Papers*, 2015(214), p. 1. doi:10.5089/9781513586359.001.; Benedek, D. *et al.* (2019) 'Varieties of VAT pass through', *International Tax and Public Finance*, 27(4), pp. 890–930. doi:10.1007/s10797-019-09566-5.

[340] Benzarti, Y. *et al.* (2020) 'What goes up may not come down: Asymmetric incidence of value-added taxes', *Journal of* Political *Economy*, 128(12), pp. 4438–4474. doi:10.1086/710558.

[341] Bernal, A. (2017) 'Do small value-added tax rate decreases on groceries imply lower prices for consumers?', *Eastern European Economics*, 56(1), pp. 81–98. doi:10.1080/00128775.2017.1412265.

[342] Benkovskis, K. and Fadejeva, L. (2014) 'The effect of VAT rate on inflation in Latvia: Evidence from CPI Microdata', *Applied* Economics, 46(21), pp. 2520–2533. doi:10.1080/00036846.2014.904492.

[343] Ván, B. and Olah, D. (2018) 'Does VAT Cut Appear on the Menu? The Consumer Price Impact of Hungarian VAT Decreases of 2016–2017', *Public Finance Quarterly*, 63(3), pp. 355–375.

[344] Gaarder, I. (2018) 'Incidence and distributional effects of value added taxes', *The Economic Journal*, 129(618), pp. 853–876. doi:10.1111/ecoj.12576.

[345] David, P. (2012) 'Distribution of the increased tax burden for agricultural products and food in the Czech Republic', *Agricultural Economics (Zemědělská ekonomika)*, 58(5), pp. 239–248. doi:10.17221/58/2011-agricecon.

producers and retailers of unhealthy products and positively contributes to the public budget because of a lack of change in behaviour. In sum, **VAT rate reductions are costly for public budgets and are not very targeted measures** as in terms of absolute relief, higher income groups benefit more than lower income groups, and VAT reductions cannot be limited to specific target groups.[346]

Legislative restriction or ban on marketing and advertising of HFSS food and beverages to children

The revised Audiovisual Media Service Directive strengthens the provisions to protect children from inappropriate audiovisual commercial communications, including for food and beverages high in fat, trans-fatty acids, salt or sodium and sugars, including by encouraging codes of conduct at EU level. These rules apply to broadcasters and on-demand audiovisual media service providers, and are also extended to video-sharing platforms.

The EU could step up its efforts restricting marketing and advertising of HFSS food and beverages and require Member States to introduce certain measures to reduce the exposure of children and adolescents to such food and beverages. The restriction or ban can be based on the findings of the Best-ReMaP project in relation to the marketing of unhealthy food and beverages.[347] The project created a nutrient profile model to classify HFSS food and beverages that will not be allowed to be marketed to children. In case a restriction or ban is chosen, marketing and advertising in the realm of digital and social media should be effectively covered, taking into account the existing EU rules. Such measures are likely to improve public health outcomes by influencing consumer behaviour (i.e. encouraging consumers to purchase healthier drinks and foodstuffs). The measure would be uniform for the whole EU so that market distortions would be reduced (i.e. conditions for the marketing of the relevant foodstuffs and drinks would be the same in all EU Member States).

Considering the amount of legislative and policy actions taken in this field, a restriction or ban on marketing and advertising of HFSS food and beverages to children should be **a feasible measure to adopt**. Serious groundwork has been done to classify what food and beverages should not be marketed to children (i.e. nutrient profile model by the Best-ReMaP project). **Such a measure is likely to be effective to achieve the public health objective** by reducing the consumption of unhealthy food and beverages by a segment of the EU population.[348]

Co-regulation to reduce the content of HFSS in food and beverages

The EU could initiate a co-regulatory solution in relation to the content of HFSS in food and beverages. Inspiration could be drawn from the recently updated Declaration of Milano 2019-2024 signed between the Swiss Federal Department of Home Affairs and 24 Swiss companies.[349] The co-regulatory document should

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[346] Auerbach, A.J. (2010) 'Public Finance in Practice and Theory', *CESifo Economic Studies*, 56(1), pp. 1–20.

[347] The final results on the EU nutrient profile model are expected in September 2023, but some ideas can be already deduced from Best-ReMap (2021). EU coordinated approach using the WHO nutrient profile model for the identification of foods not permitted for marketing to children.

[348] Emma Boyland, Lauren McGale, Michelle Maden, Juliet Hounsome, Angela Boland and Andrew Jones (2022). Systematic review of the effect of policies to restrict the marketing of foods and non-alcoholic beverages to which children are exposed, Obesity reviews, 23 :8, https://doi.org/10.1111/obr.13447.

[349] Erklärung von Mailand 2019 – 2024. See the declaration, 2023 extension and annexes for various products at:https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/ernaehrung/produktzusammensetzung/zuckerreduktion.html.

include specific targets for food and beverage composition and/or reformulation as well as deadlines by which these targets should be achieved. The commitments could also include gradually stepped-up reduction targets (e.g. 5% reduction of sugar content in four years against an individual baseline or median baseline; minimum 5% reduction by 2025 against the 2023 median baseline) linked to the EU Farm to Fork Strategy timeline. The reduction and/or reformulation targets can be specified for different types of food and beverages jointly with the industry. A reporting and monitoring system needs to be set up jointly with civil society partners to make the commitments credible and effective.

This measure would contribute to the objective of improving public health. It would incentivise producers to reformulate their recipes and put healthier food and drinks on the market. This would broaden the consumer choice of such products and encourage their consumption. Of course, being a non-binding, co-regulatory measure, it might be limited in its effectiveness.[350]

Soft law measures

The European Commission could adopt a wide range of soft law measures that would facilitate the approximation of national taxation rules in the area of HFSS taxation. A c**ollection of best practices with HFSS taxes** could be created. Collating such best practices may help those Member States that do not yet have HFSS taxes decide on their adoption by providing ideas for tax design that are consistent with EU law. It is worth studying the best practices of non-EU countries (e.g. Norway, UK, South Africa and Chile) and assessing them within the EU context. EU Member States will then have the opportunity to select the most suitable design elements based on the national circumstances, the structure of the relevant industry sectors, consumption preferences and other factors.

The same considerations apply to the adoption of recommendations or **guidelines on HFSS taxes**. Such documents could provide examples and explain tax design elements.

Another instrument of approximation for HFSS taxes could be a **glossary or inventory of tax design elements** accompanied by definitions, detailed explanations and concrete examples.

A **model law for HFSS tax** could be developed to provide a strong blueprint of legal rules that are effective and efficient in achieving the desired public health and fiscal objectives, while also being compatible with the internal market.

Such soft law measures are unlikely to have strong impacts on fiscal or public health objectives as they do not create any obligations for Member States and leave the decision regarding the introduction of HFSS taxes completely at their discretion. They may, however, provide methodological guidance to some countries which are exploring different HFSS taxation options. While such measures do not replace harmonisation, their importance in preparation for a potential harmonisation should not be underestimated as they help create shared understanding and definitions and/or align some basic ideas and approaches to HFSS tax design.

[350] Please see the modelling study that came to the conclusion that voluntary agreements are insufficient on their own and need to be accompanied by interventions to improve dietary consumption patterns and population health: Goiana da Silva et al. (2019), Modelling impacts of food industry co-regulation on non-communicable disease mortality, Portugal.

Fostering administrative cooperation between responsible national authorities

The European Commission could establish an **expert group on HFSS tax**. This group could consist of the representatives of responsible ministries, national tax authorities and tax experts. At the very least, such an expert group would help to develop a shared understanding and vocabulary as it will exchange information and knowledge on the design and implementation of HFSS taxes and their effects. It could be more hands-on and be involved in or tasked with the development of draft soft law measures or involved in monitoring the commitments by companies. Similarly, this measure is not a substitute for HFSS tax harmonisation, but rather an accompanying or preparatory measure to harmonisation.

4. A POSSIBLE EU HARMONISED SSB TAX – DESIGN AND IMPACTS

This chapter explains three different scenarios for a potential EU-harmonised SSB tax and simulates the most important effects. The starting point is the already implemented SSB taxes in 11 Member States from which key design features can be identified. While the analysis of the national HFSS taxes is broader, the focus of the exploratory analysis of harmonisation is on a potential EU-wide harmonisation of soft drink taxes because 11 Member States (out of the 12 Member States with an HFSS taxation) tax soft drinks, while only two tax other products. The scope of the harmonisation is further narrowed to SSB taxes, i.e. not including artificial sweeteners for the reasons outlined in this chapter. Given the exploratory nature of the analysis, we use simple illustrative scenarios instead of fully specified policy options. The discussed scenarios are not necessarily the best way to harmonise SSB taxes, which is also due to the fact that the exact policy goals are yet to be determined.

4.1. Key design features of an EU harmonised SSB tax

As background to these simulation scenarios, the key design features of existing soft drink taxes in EU Member States are presented. We identify seven key design features:

1. The **level of government** levying the tax (central government versus subnational government)

2. The **type of tax** (specific excise tax versus ad valorem tax)

3. The **scope of taxable products** (carbonated drinks, soft drinks, milk-based products, energy drinks, etc.) and **taxable ingredients** (total, free and added sugar, artificial sweeteners, etc.)

4. The **tax base** (volume or weight)

5. The **tax structure** (the overall level of the tax burden, and whether a flat rate or progressive tax schedule is used)

6. The **point of taxation** (producers versus retailers)

7. **Exemptions**

These general key design features are also relevant for a potential EU-harmonised SSB tax. In what follows, we will briefly present and discuss them from the perspective of initiatives which implement some harmonisation of SSB taxation in the EU. Generally, one key argument for a certain specific form of a key design feature is the current situation in Member States. Acceptance of EU-wide harmonisation in general, and of specific design features of a potential EU-harmonised SSB tax in particular, can be expected to be higher overall if the proposed harmonisation design corresponds to unilateral designs predominant in the majority of those Member States currently taxing SSBs. Member States with higher ambitions regarding the level of SSB taxation have the possibility of exceeding the minimum standards foreseen within an EU-wide minimum harmonisation and no downward adjustment is necessary. Therefore, we point out the predominant specific designs in Member States with SSB taxes when

presenting and discussing the key design features of a possible EU-wide harmonised SSB tax.

Level of government

SSB taxes can be levied at the central government or at the subnational levels, as is currently the case in Catalonia. The implementation of a potential EU-harmonised SSB tax implies that SSB taxes are levied throughout a country and unilateral subnational SSB taxes are against the spirit of an EU-wide harmonisation. Implementation of SSB taxes at the national level minimises the administrative burden, has the advantage of simplicity and transparency, and prevents tax avoidance within Member States through shifting sales to regions with lower tax rates. Almost all existing national soft drink taxes in the EU are levied at the central level so that an identical tax design is applied throughout those Member States taxing soft drinks. The only exception is Spain where soft drinks are taxed in the autonomous region of Catalonia only, i.e., at a subnational governmental level.

Type of tax

A potential EU-harmonised SSB tax could be levied as an ad valorem tax or as a specific excise tax. An ad valorem tax is levied as a percentage of the price of taxable drinks, while a specific excise tax is levied as an absolute amount of money based on the volume or the sugar content of a taxable drink. Ad valorem taxation is globally typically used in lower income countries with a revenue raising motivation in mind, which is clearly not the central objective of a harmonisation of SSB taxes at EU level. In contrast to ad valorem taxes, specific excise taxes increase the prices of cheaper drinks to a larger extent in relative terms compared to more expensive drinks, which decreases the incentive to switch from more expensive to cheaper drinks to limit overall expenditures on taxed SSBs. At the same time, low-income groups that tend to buy cheaper drinks may be over-proportionately burdened by a specific excise tax. Moreover, a minimum specific excise tax implies cross-country differences in the tax burden given differences in purchasing power within the EU. In terms of effectiveness with regard to their health objectives, specific excise taxes based on the sugar content of taxable drinks are able to influence consumer behaviour through relative price increases of the unhealthy products. One crucial characteristic of the specific excise tax is that the steering potential is eroded if the tax rate is not inflation-adjusted on a regular basis, as inflation erodes the real value of specific excise taxes. All Member States applying HFSS taxes in general, and SSB taxes in particular, use specific excise taxes. Therefore, a potential EU-harmonised SSB tax should take the form of a specific excise tax, with the tax rate regularly adjusted for inflation.

Scope of taxable products and taxable ingredients

Taxable products could include a broad scope of non-alcoholic soft drinks, comprising water-based carbonated or non-carbonated soft drinks (CN codes 2022, including energy drinks, i.e. non-alcoholic functional beverages with a stimulating effect and unique combinations of characterising ingredients with a nutritional or physiological effect), fruit-juice based drinks (CN codes 2009, including nectars and fruit juices) as well as possibly other drinks such as milk-based products (CN codes 0402, including flavoured milk, milk tea and coffee, and

fermented milk drinks as kefir and buttermilk).[351] The scope could be broad to include soft drinks with artificial sweeteners or be limited to SSBs.[352] From a pure tax perspective, the scope of taxable products should be as comprehensive as possible to avoid a shift from taxed to non-taxed products, which would undermine the revenue objectives of taxation and put taxed drinks at a competitive disadvantage to non-taxed drinks. From a health perspective, the scope of taxable products should include all products which are deemed to have negative health impacts, while excluding products which are considered (more) healthy.

According to this perspective, sugar-sweetened milk-based products (CN codes 0402) could be taxed. However, currently, several Member States exclude such drinks, because milk itself is seen as an element of a balanced diet, particularly for children. Likewise, fruit juices (CN codes 2009) are also often excluded by Member States. While fruit juices are a source of free sugars with little fibre, they also provide micronutrients at levels similar to those found in whole fruit. Therefore, for both sugar-sweetened milk-based products and fruit juices there are concerns about the sugar intake and balancing this with any potential beneficial health effects. Therefore, in the proposed scenarios it remains at the Member States' discretion to include such products in the taxable scope, a potential EU-harmonised SSB tax should not include them.

Likewise, artificial sweeteners, are taxed in the majority but not all of the Member States with soft drink taxes. As the evidence on potential negative health effects of artificial sweeteners is weaker than for free and added sugar, Member States may want to incentivise a substitution effect by excluding soft drinks with artificial sweeteners from taxation. It is well-known that reduction of sugar intake through SSBs works better if the non-taxed products are a closer substitute to the taxed SSB[353]. For these reasons, in the proposed scenarios it remains at the Member States' discretion to include artificial sweeteners in the taxable scope, and a potential EU-harmonised SSB tax should not include them.

In EU Member States, existing taxes on non-alcoholic drinks are levied on various ingredients. SSB taxes focus on non-alcoholic drinks containing free or added sugar, such as sugar, corn syrup, dextrose, or fructose. The scope of taxable products for EU-wide harmonisation in the proposed scenarios is on products that contain free or added sugar. However, as negative health effects of a diet containing an excessive amount of sugar have been proven, the tax base in the scenarios is linked to the total sugar content of such products, which is also consistent with the labelling requirements which require the producers to report the total sugar content.[354]

Other possible ingredients of SSB or soft drink taxes could be targeted according to national preferences and political decisions through individual SSB taxes at Member State level. Also, other ingredients which are typically found in energy drinks, such as taurine or caffeine, and are currently taxed in a few of the Member

[351] The combined nomenclature (CN) codes are an approach to get a harmonised definition of the scope of taxable product. However, since the CN codes are defined for customs purpose, they might not be fully clear for the delineation for SSB taxes. E.g. the CN code 2009 11 91 describes "Not frozen orange juice with a brix value between 20 and 67 and of a value not exceeding € 30 per 100 kg net weight and with an added sugar content exceeding 30 % by weight". So, any orange nectars with less added sugar are not contained in this CN code, but might still be within the taxable scope.

[352] The CN codes do not distinguish between the form of sweetening the products.

[353] See Jysmä et al (2019) for evidence for product substitution to artificially sweetened beverage but not from ice cream to cookies after the introduction of the excise tax in Finland.

[354] If a product contains only natural sugar, e.g. fruit juices, it remains outside the scope in our scenarios. As soon as it additionally contains free or added sugar, e.g. nectars, the total sugar in the product is taxed.

States with soft drink taxes, should be outside the scope of the scenarios for EU-harmonised SSB tax.

Tax base

SSB taxes can be levied on the volume of taxable products or on the weight of the sugar contained in SSBs. Targeting the volume of taxable drinks precludes the option to differentiate the tax structure according to the amount of sugar contained in SSBs. Volume-based SSB taxation has administrative advantages but is less optimal for SSB taxation motivated by health rather than fiscal objectives.

Tax structure

Regarding the tax structure of a specific excise tax, there are basically three options. The first option is a flat rate, i.e. a fixed amount of money levied on the volume of taxable drinks regardless of their sugar content. Such flat rates are applied in three Member States taxing SSBs.[355] The second option is a flat rate proportional to the sugar content of taxable drinks, i.e., a fixed amount of money per gram of sugar contained in a drink. Such a tax rate scheme is applied in none of the Member States taxing SSBs. The third option is a progressive tax schedule consisting of tiered rates that increase with the sugar content of taxable drinks. Such a progressive tax schedule is used in the majority of SSB tax systems in the Member States. Moreover, a minimum threshold regarding the sugar content can be foreseen so that drinks with a low sugar content can remain tax-free. Combined with a flat rate, a minimum threshold implies a progressive tax design. Evidence suggests that progressive tax schedules incentivise producers to reformulate SSBs; this incentive is reinforced by a minimum threshold for sugar content below which taxable drinks remain tax-free. The tax schedule of an EU-wide harmonised SSB tax should combine a uniform flat rate or tiered rates with a low minimum threshold for sugar content. The minimum threshold should be rather low considering the existing evidence suggesting that product reformulation is most likely if the threshold is within a certain range of the existing sugar content. Member States still have the possibility to exceed the minimum threshold. This design will allow Member States to keep or introduce, respectively, directly progressive tax schedules, while Member States preferring uniform tax rates can stick to or implement, respectively, such a tax rate structure.

Point of taxation

SSB taxes can either be collected from manufacturers/ importers or from retailers. All Member States taxing SSBs levy the tax on producers/ importers, which has the advantage of establishing incentives for producers to reformulate their products, while retailers cannot influence SSB recipes.

Exemptions

Exemptions can refer to several design features of SSB taxes: particularly to certain producers (particularly small and independent ones), to certain SSB products (e.g. milk-based products), or to the level of the sugar content of taxable drinks. Two existing tax systems in Member States apply a minimum threshold regarding the sugar content of taxable drinks and some Member States do not tax

[355] Belgium, Finland and the Netherlands.

small and independent producers.[356] In our scenarios for a potential EU-wide harmonised SSB tax we do not include explicit harmonisation of any exemptions but rather propose the possibility of an exemption for both small independent producers and for drinks with a very low sugar content.

The argument in favour of the possibility of a de minimis exemption for small independent producers is twofold. First, the acceptance of an EU-wide harmonisation of SSB taxes would be undermined if small local producers would lose out in terms of relative competitiveness, and second, the administrative burden for dealing with a large number of small taxpayers is disproportionate. Exempting the smallest producers from the SSB tax does little to affect the health outcome because the market shares of small independent producers are negligible. For example, the threshold in Finland is 50,000 litres of final product. In Euromonitor data, the smallest measurement unit is 100,000 litres per year. The share of all product brands with a sold volume of 100,000 litres or kilogrammes or less, plus all product brands in the category "Other" is for SSBs (soft drinks, juices including 100% natural juices, energy drinks, sport drinks, RTD tea and RTD coffee) in 2022: 15% in Belgium, 7% in France and 8% in Poland. However, this is a clear overestimate because the producers of product brands in the category "Other" are not necessarily all independent.

As a side note, for the aggregate of chocolate, ice cream and confectionery in Denmark, the proportion of product brands sold at 100,000 kilogrammes per year or in the category "Other" is 27% of the sales value in 2022 (no product brand level data in kilogrammes is available as part of Euromonitor data). This relatively high proportion is mainly caused by a high proportion of pastry shops in the sales value of pastries and cakes.

4.2. Effects of a possible EU harmonised SSB tax

4.2.1. Scenarios for EU harmonised SSB taxation

Based on the above considerations regarding the key design features, three scenarios for an EU harmonised soft drink tax have been developed. The three scenarios share most design features and vary only in the most important aspect, namely the **tax rate structure**. This approach reflects that for some design features the recommendations for potential EU harmonisation are relatively clear, while the most important decision about the level and structure of the EU harmonised tax rates should be the result of careful consideration of potentially conflicting policy goals.

All harmonisation scenarios foresee a minimum level of taxation imposed through a **directive**, i.e., implementation would take place at the national level (similar to the existing harmonisation of other excise duties). Given that the directive would only set out minimum tax rates, stricter national implementation is possible by, for example, extending the scope of taxable products or applying higher tax rates.

The second main consideration for potential EU harmonisation is that the design features are **informed by the existing SSB taxes** in the Member States as stated in Table 5. Starting from the existing tax systems will definitively increase the

[356] Catalonia and Ireland only tax products with a sugar content above 5g/100ml. Regarding the small business exemption, for example, Ireland links the exemption for the soft drinks excise tax to the thresholds for becoming a taxable person or the registration threshold for VAT, while Finland exempts producers with an output below 50,000 litres.

political and public acceptance in the Member States, since a minimum EU harmonisation will not require all Member States to change the national tax policies.

Table 5: Important design features of SSB taxes in EU Member States

Country	*Sugar only or also artificial sweeteners*	*Major product inclusions/ exclusions*	*Tax structure*	*Tax rates (€ per hl)*	*tax rate at 5 g sugar/100 ml (€ per hl)*
BE[357]	Both	100% juices	**Uniform** If containing sugar/sweetener Sugar free water Non-alcoholic beers, wines	11.92 6.81 3.75	11.92
HR[358]	Sugar only	For fruit and vegetable juices, only added sugar is taxed	**Progressive** <2gr/100 ml 2-5 g/100 ml 5-8 g/100 ml >8 g/100 ml	2.65 3.98 6.63 10.61	6.63
FI[359]	Both	Pure fruit juices and milk-based products	**Uniform** If containing sugar/sweetener Sugar free	32 13	32
FR[360]	Both	Excl. milk-based drinks and 100% juices	Sugar: Progressive <1 g/100 ml 2-4 g/100 ml 5-7 g/100 ml >8 g/100 ml Sweeteners: Uniform	3.17 +0.52/g +1.05/g +2.10/g	5.8
HU[361]	Sugar only	Excl. >50% milk, >25% fruit or vegetable. Energy drink tax based on methylxanthine or taurine only	Sugar: Progressive <8 g/100 ml >8 g/100 ml Energy drinks > 15 mg/100 ml methylxanthine With taurine	2.00 5.75 16.25 97.50	2
IE[362]	Sugar only	Excl. drinks with >119mgr calcium/100 ml, 100% juices	Progressive <5 g/100 ml 5-8 g/100 ml > 8 g/100 ml	0 16.26 24.39	16.26
LV[363]	Both	Excl. >10% fruit if no more than 10% sugar is added	Progressive <8 g/100 ml >8 g/100 ml	7.4 14	7.4

[357] See https://www.fieb-viwf.be/nl/gezondheidstaks/;https://ec.europa.eu/taxation_customs/tedb/splSearchForm.html
[358] See https://ec.europa.eu/taxation_customs/tedb/taxDetails.html?id=3221/1672527600
[359] See https://ec.europa.eu/taxation_customs/tedb/taxDetails.html?id=2001/1672527600, https://www.vero.fi/yritykset-ja-yhteisot/verot-ja-maksut/valmisteverotus/virvoitusjuomavero/virvoitusjuomaverotaulukko/
[360] See https://entreprendre.service-public.fr/vosdroits/F32101
[361] See https://konyvelescentrum.hu/adok-es-jarulekok-kozterhek/nepegeszsegugyi-termekado-neta/ https://nav.gov.hu/pfile/file?path=/ugyfeliranytu/nezzen-utana/inf_fuz/2023/53.-informacios-fuzet---nepegeszsegugyi-termekado,
https://www.revenue.ie/en/companies-and-charities/excise-and-licences/sugar-sweetened-drinks-tax/rate-of-tax.aspx
[363] See https://ec.europa.eu/taxation_customs/tedb/taxDetails.html?id=406/1672527600

Country	Sugar only or also artificial sweeteners	Major product inclusions/ exclusions	Tax structure	Tax rates (€ per hl)	tax rate at 5 g sugar/100 ml (€ per hl)
NL[364]	Both	Incl. unsweetened mineral waters (inclusion will be abolished in 2024)	Uniform 2023 2024	 8.83 26.13	8.83
PL[365]	Both	Excl. >20% fruit if <5 g/100 ml sugar excl. Milk drinks	Progressive <5 g/100 ml > 5 g/100 ml	 11 +1.1/g	11
PT[366]	Both	Excl. fruit juices, nectars and milk drinks	Progressive <2.5 g/100 ml 2-5 g/100 ml 5-8 g/100 ml >8 g/100 ml	 1.05 6.32 8.42 21.07	8.42
Catalonia (ES)[367]	Sugar only	Excl. 100% juices and milk drinks	Progressive <5 g/100 ml 5-8 g/100 ml >8 g/100 ml	 0 10 15	10
Lowest (non-zero) tax rate				**1.05**	**2**
Average lowest (non-zero) tax rate				**7.93**	**11.03**

Design features held constant for all three scenarios

We propose that all the harmonisation scenarios are for **national taxes**. There is no plausible argument in favour of introducing a harmonisation at the subnational level. Therefore, any realistic scenario assumes some form of harmonisation at Member State level.

We propose that the harmonisation foresees a **specific excise taxation**. All Member States currently taxing soft drinks use specific excise taxes. Therefore, there is a limited argument in favour of an ad valorem taxation because this would force all Member States to change their existing systems. Additionally, ad valorem taxation is globally typically used in lower income countries with a revenue raising motivation in mind, which are clearly not the same conditions for a harmonisation of HFSS taxes at EU level.

Regarding the **scope** of taxable products, we propose, for the purpose of the analysis, to include **all soft drinks with free or added sugar** but exclude milk-based products.[368] This exclusion does not prohibit a broader scope of SSB taxation at the Member State level. It is rather intended as a definition of taxable products for which the Member States need to levy SSB taxes. It remains possible for Member States to include milk-based products or fruit juices in the scope of taxable products. For example, milk-based products are exempted, following the example of five Member States (Finland, France, Hungary, Poland, Portugal and Spain) with

[364] See https://download.belastingdienst.nl/douane/docs/tarievenlijst-accijns-acc0552z89fd.pdf; https://www.rijksoverheid.nl/onderwerpen/belastingplan/gezondheid/verbruiksbelasting-alcoholvrije-dranken
[365] See https://podatkinazdrowie.pl/podatek-cukrowy-i-piwo-bezalkoholowe/
[366] See https://info-aduaneiro.portaldasfinancas.gov.pt/pt/estatisticas/Pages/estatisticas.aspx (Imposto: 2)
[367] See https://atc.gencat.cat/es/tributs/ibee/base-imposable-gravamen/
[368] Per definition the limitation of the scope to products with free or added sugar excludes fruit juices from the scope.

soft drink taxes and Catalonia. Likewise, for the taxable ingredients, we do not foresee the inclusion of artificial sweeteners in the harmonised scope, but the harmonisation does not prevent Member States from including drinks with artificial sweeteners, as is currently the case in the majority of Member States taxing soft drinks (Table 1).

In line with existing SSB tax systems, we propose to define the **tax base** as **weight of the total sugar** in the drink. This is directly related to the fact that we only propose to harmonise a minimum tax on drinks with free or added sugars and not artificial sweeteners for which the volume definition would be more relevant.[369]

For the structure of excise taxation, we do not propose a progressive system, but **explicitly allow a progressive excise system**. Some of the Member States currently levying taxes on sugar-sweetened beverages apply uniform tax rates (Belgium, Finland and the Netherlands) (Table 1). The majority of Member States, however, use progressive rates tiered by sugar content (Croatia, France, Hungary, Ireland, Latvia, Poland, Portugal, and the Spanish region of Catalonia). In our scenarios for an EU harmonised uniform minimum tax rate, Member States are allowed to keep or introduce, respectively, progressive tax schedules. Member States preferring uniform tax rates are not precluded from implementing such a tax rate structure.

Finally, we propose to harmonise the minimum level of excise taxation **without explicit harmonisation of any exemptions**, but rather to include the possibility of an exemption for both small independent producers and for drinks with very low sugar content. Therefore, the proposed scenarios only demand a minimum taxation of SSBs with a sugar content of more than 5g/100 ml. This does not prevent Member States from taxing SSBs with a lower sugar content. The possibility of an exemption for small and independent producers of SSBs is only possible up to a threshold to be defined.[370]

Three scenarios for harmonisation of minimum SSB taxation

We propose three scenarios with the main variation between Scenarios 1 and 2 being in the level of the minimum tax rate applicable, holding the other design features constant as described above. Scenarios 2 and 3 are broadly comparable in the level of minimum taxation, but the latter is more progressive by incorporating an additional tier.

We suggest determining the different minimum tax rates and thresholds for additional tiers applied in the three different scenarios based on the currently existing SSB taxes in the Member States as described in Table 1 and along the following considerations.

Scenario 1 is a **minimum tax set at the lowest tax rate on SSBs currently applied** in the 11 Member States levying such a tax. The simplest version of this scenario would just use the lowest non-zero tax rate, which would be €1.05/hl (applied in Portugal). An alternative version of this scenario would be to account for the sugar content by using the lowest tax rate for a sugar content of 5g per

[369] There is no information about the volume of artificial sweeteners publicly available. However, this is not relevant for our simulation which only taxes the sugar content of drinks. Partial substitution of sugar with artificial sweetener, i.e. product reformulation, therefore, reduces the tax base in our simulation.

[370] For the simulation we assume that the effects of such an exemption are negligible for the overall outcome, which reflects that such an exemption threshold should be set at a relatively small output level.

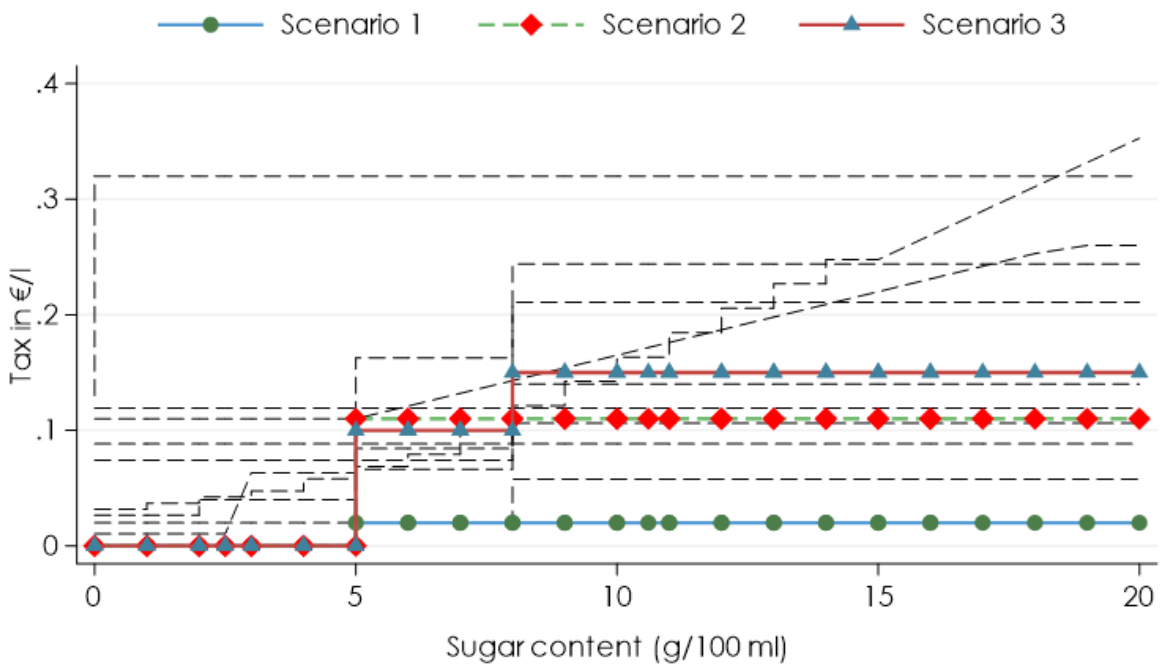
100 ml. The lowest SSB tax rate would then be €2/hl (applied in Hungary). Considering the potential exemption for SSBs with a sugar content below 5g/100 ml, the proposed rate for the first scenario is **€2/hl**.

Scenario 2 is based on the **average tax rate of the 11 existing SSB taxes** in the EU. In case of a progressive tax schedule different variants of the average tax rate are possible. The average of the lowest non-zero tax rates could be used, which would result in a value of €7.93. Accounting for the sugar content by using the lowest tax rates for a sugar content of 5g/100ml would yield an average tax rate of **€11/hl**, which is the preferred option given the potential exemption for SSBs with a sugar content below 5 g/100 ml.

Scenario 3 directly takes into account the progressive schedules observed in some Member States. To this end we propose to have a **two-tiered minimum tax rate**; for all SSBs with a sugar content between **5g/100 ml and 8g/100 ml** we propose to model a minimum tax rate at **€10/hl**, while for SSBs with a sugar content above 8g/100 ml a higher minimum tax rate of **€15/hl** applies.

Figure 27 summarises the three scenarios and puts them into context with the existing SSB taxes in the Member States.

Figure 27: Tax schedules by sugar content, existing SSB taxes vs. scenarios



Source: WIFO based on country fiches and scenario assumptions

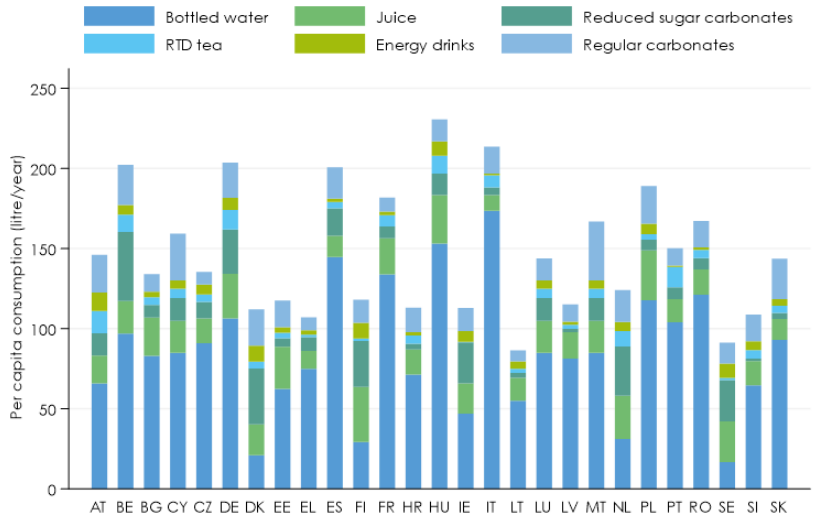
The comparison with the existing SSB taxes in Figure 27 highlights that Scenario 1 will primarily affect the 16 Member States which do not have a SSB tax in place currently. Scenarios 2 and 3 in contrast will also affect some Member States with existing SSB taxes.

4.2.2. Baseline for simulation – Status Quo

To simulate the potential effects of an EU harmonised soft drink tax, it is important to take stock of the status quo, i.e., to define a baseline to compare the simulated results against. There is no uniform dataset containing all the necessary information readily available. Therefore, we merge and extrapolate information from different data sources.[371] As a starting point we use the household budget surveys (HBS) to obtain information about the household characteristics and the basic consumption patterns. The consumption patterns and price information for SSBs are augmented and extrapolated with information from Euromonitor at the country level to arrive at a dataset at the household level with information about the consumption and expenditure for six drink types (bottled water, juices, ready-to-drink teas, energy drinks, regular carbonates and reduced sugar carbonates)[372].

Figure 28 shows that, when aggregated at the country level, there is substantial variation in the per capita consumption of different soft drinks.[373] Bottled water is the most consumed drink type, with southern countries like Italy and Spain leading in per capita consumption. Of the products in scope for a SSB tax, the regular carbonates have the largest per capita consumption, with Romania, Bulgaria and Slovakia exhibiting the highest per capita consumption. Reduced sugar carbonates show the highest per capita consumption in Belgium, the Netherlands and the Nordic countries. The variation in per capita consumption of juices and nectars is relatively small, with southern countries tending to have lower consumption. Energy drinks show the highest per capita consumption in Austria, Hungary and the Nordic countries.

Figure 28: Baseline per capita consumption of soft drinks by country



Source: WIFO extrapolation from HBS and Euromonitor data.

[371] See Appendix for a more detailed description of the construction of the dataset.

[372] Note that the category 'juices' here refers to the COICOP category 01.2.2.3 Fruit and vegetable juices (ND), while the categories 'RTD tea', 'energy drinks', 'reduced sugar carbonates' and 'regular carbonates' are extrapolated from the COICOP category 01.2.2.2 soft drinks using country specific information from Euromonitor. The product category 'reduced sugar carbonates' is from Euromonitor, which categorises this as '*products with lower sugar content compared to 'standard' offering, and is positioned on the basis of being 'better for you'/reduced sugar. A sugar-reduced product will typically contain artificial sweeteners in addition or instead of sugar, and as a result the total sugar/calorie content is lower compared to what is* considered '*standard*'.

[373] Note that the overall consumption in the countries can be somewhat different and potentially higher, because the HBS data does only capture the off-trade consumption of the households and does not include the consumption of tourists.

Table 6 shows the average prices for the drinks, which are (at least partially) within the scope of SSB taxes. In line with the lower income levels, Eastern European countries tend to have lower prices for all drink types. Additionally, some countries with SSB taxes in place show higher prices for the products in scope. Overall, the variation in the average price for regular carbonates is substantial with litre prices below €1 in Greece, Croatia, Hungary, Malta, Poland, Romania and Slovakia, and average prices as high as €2.808 in Finland.

Across different products, energy drinks are clearly the most expensive sort of soft drink with an EU wide average litre price of €3.505. In contrast, both reduced sugar and regular carbonates only exhibit an average price of € 1.202.

Table 6: Baseline average prices (€/litre) by EU Member States and drink type

Country	*Juices*	*Energy drinks*	*RTD teas*	*Reduced sugar carbonates*	*Regular carbonates*
AT	2.45	4.08	1.48	1.31	1.91
BE	2.37	3.18	1.50	1.51	2.40
BG	1.69	4.66	1.59	1.08	1.07
CY	1.88	3.86	1.53	1.25	1.00
CZ	3.16	2.61	1.15	0.97	1.48
DE	1.84	3.57	0.98	0.99	1.20
DK	3.25	5.01	3.06	1.55	2.08
EE	2.05	4.07	1.71	1.62	1.22
EL	1.66	3.80	2.33	1.55	0.99
ES	1.48	3.61	1.40	1.06	1.55
FI	2.43	6.49	3.91	1.96	2.79
FR	1.87	3.59	1.15	1.41	1.59
HR	2.35	4.60	1.69	1.43	0.79
HU	1.07	2.51	0.88	0.84	0.72
IE	2.45	4.70	2.52	1.92	1.92
IT	2.07	4.27	1.13	1.19	1.28
LT	2.54	3.32	1.36	1.50	1.75
LU	2.87	3.83	1.54	1.24	2.25
LV	1.67	2.81	1.40	1.64	1.20
MT	1.95	3.88	1.53	1.25	0.99
NL	1.43	4.58	1.24	1.18	1.47
PL	0.97	2.59	1.11	1.22	0.58
PT	1.92	4.01	0.94	0.93	1.92
RO	2.79	2.93	0.91	0.68	0.62
SE	2.96	5.36	2.60	2.33	2.50
SI	2.04	4.06	0.99	0.97	1.66
SK	1.54	3.00	1.27	1.00	0.70
Total	**1.78**	**3.53**	**1.28**	**1.16**	**1.23**

Source: WIFO calculations based on HBS and Euromonitor data.

The construction of the household-level dataset makes it possible to distinguish between different household types. For our simulation, we make distinctions using the following dimensions: **Household composition** (single male households, single female households, households without children, households with children), **household income** (five income quintiles of OECD equivalised income), **soft drinks consumption intensity** (no consumption, less than 20l per capita/year, 20-40l per capita/year, 40-60l per capita/year, 60-100l per capita/year, and more than 100l per capita/year). This results in 120 different household types per Member State.[374]

To model the daily sugar intake through SSB additional **assumptions about the sugar content** are necessary. Bottled water contains per definition no sugar. For RTD teas it is assumed that one third have a sugar content of 4.5 g/100 ml, one third have a sugar content of 6.2g/100 ml and one third have a sugar content of 9g/100 ml. For fruit juices and nectars, we assume that one third of the products are nectars with an average sugar content of 9g/100 ml. [375] For the fruit juices no assumption about sugar content is made, because fruit juices are not subject to SSB taxes in most Member States and the scenarios do not foresee any taxation of fruit juices. For energy drinks we use information from Euromonitor about the reduced sugar energy drinks consumed in the Member States to determine the share of zero-sugar energy drinks at Member State level. For all other energy drinks, a sugar content of 11g/100 ml is assumed. [376]

Table 7: Baseline average daily sugar intake by EU Member States and consumption intensity

Country	Non-consuming HH (in%)	Average daily sugar intake in grams by consumption intensity					
		Overall	<20l	20-40l	40-60l	60-100l	>100
AT	28.7	9.3	1.5	4.0	7.2	11.7	34.0
BE	9.2	9.4	1.1	3.2	5.5	8.8	23.1
BG	5.6	3.3	1.6	5.4	9.1	13.8	28.9
CY	23.7	11.5	1.5	4.5	8.3	13.7	34.1
CZ	10.2	3.6	1.2	4.0	7.0	11.5	25.6
DE	47.2	7.5	1.5	4.7	7.4	11.4	30.6
DK	17.2	7.8	1.0	3.3	6.1	10.1	31.3
EE	35.6	4.9	1.5	4.4	7.7	12.7	26.7
EL	38.8	3.7	1.3	3.6	6.6	11.2	20.3
ES	32.2	6.1	1.3	3.9	6.9	11.2	26.0
FI	28.2	5.3	1.2	3.2	5.4	8.9	21.6
FR	51.6	5.3	1.4	3.4	5.9	9.4	24.8
HR	30.3	5.5	1.3	4.0	7.7	13.0	28.7
HU	31.0	7.2	1.6	3.9	7.0	10.6	28.4
IE	24.5	4.8	1.4	3.5	6.1	9.9	21.2
IT	35.5	6.7	1.6	4.5	7.9	12.5	30.2

[374] Of which 100 are relevant for the simulation, because households which do not consume soft drinks are not directly affected by an EU harmonised tax on soft drinks.
[375] Mostly informed by the sugar content of popular brands, such as Lipton, Fuze Tea and Nestea.
[376] This is informed by the fact the most popular brands have a sugar content of either exactly 11g/100 ml, e.g. Red Bull, or a comparable sugar content, e.g. Hell, Monster Energy, Rockstar, etc.

Country	Non-consuming HH (in%)	Average daily sugar intake in grams by consumption intensity					
		Overall	<20l	20-40l	40-60l	60-100l	>100
LT	42.4	2.3	1.5	4.1	6.9	11.8	22.2
LU	24.4	6.7	1.1	2.9	5.0	8.2	21.6
LV	54.2	3.2	1.8	4.7	8.2	13.2	25.7
MT	19.6	12.8	1.6	4.7	8.4	14.0	37.8
NL	33.4	9.6	1.3	3.1	5.2	8.3	25.5
PL	15.4	8.1	1.6	4.9	8.7	14.4	31.9
PT	47.9	4.9	1.5	3.9	7.1	11.6	25.5
RO	55.9	5.0	2.8	6.7	11.6	17.5	39.8
SE	25.4	4.2	1.3	3.7	6.5	10.4	23.2
SI	33.2	6.5	1.6	4.4	7.8	13.1	32.8
SK	19.2	7.9	1.5	4.9	9.0	14.7	33.8
Total	**36.0**	**6.7**	**1.6**	**4.5**	**7.7**	**12.0**	**29.0**

Source: WIFO calculations based on HBS and Euromonitor data.

For regular carbonates we assume a sugar content of 10.6g/100 ml for a leading brand (Coca Cola), for which we use information from Euromonitor to derive a country specific brand share. For the other carbonates we use information about the sugar content of different brands in each Member States to arrive at three Member State-specific shares of sugar contents: 6g/100ml, 8.5g/100ml, and 11g/100ml.[377] For simplification we assume in the simulation that all reduced sugar carbonates only include artificial sweeteners and therefore are not subject to the SSB tax in the scenarios.

Table 7 summarises the resulting values for average daily sugar intake through SSBs. The EU wide average of 6.7g daily sugar intake results from widely varying subcategories. For example, the share of households which are not consuming any SSBs (according to the HBS data) varies from 5.6 percent in Bulgaria to more than half in France, Latvia and Romania. Additionally, the breakdown by consumption intensity highlights the trivial but very important fact that heavy consumers have a higher daily sugar intake.

Table 8 highlights the variation for average daily sugar intake through SSBs by household types and income quintiles. The strongest results here is the clearly higher than average sugar intake for single male households. Additionally, households with higher incomes consume more SSBs, which results in a higher average daily sugar intake. However, the differences across income quintiles are small, reflecting the fact that expenditures for SSBs are relatively lower for richer households.

Table 8: Baseline average daily sugar intake by household type and income quintile

Household type	Income quintile (equivalised OECD income)					
	1st	2nd	3rd	4th	5th	Total
Single male	8.4	8.8	9.5	9.2	9.8	**9.1**

[377] The country-specific sugar contents of soft drinks are derived from the Open Food Facts database available at: https://world.openfoodfacts.org/.

Household type	Income quintile (equivalised OECD income)					
	1st	2nd	3rd	4th	5th	Total
Single female	6.1	6.4	6.5	6.4	7.1	**6.4**
Households with children	5.4	6.7	6.9	6.9	6.7	**6.5**
Household without children	5.3	6.1	6.6	7.0	7.0	**6.5**
Total	**5.9**	**6.5**	**6.9**	**7.0**	**7.2**	**6.7**

Source: WIFO calculations based on HBS and Euromonitor data.

To get a better understanding of how well the constructed dataset is able to reproduce Member States' actual tax revenues Table 9 contrasts the observed with the simulated tax revenues. For all national SSB taxes the simulated tax revenues are substantially below the observed tax revenues, which is not surprising as several of the HFSS tax systems apply a broader scope than just SSBs with added sugar. However, for some Member States, most notably Latvia, Hungary and France, the discrepancy is so large that it also reflects the poor coverage in the HBS data. Finally, the simulated revenues for Catalonia are substantially higher than the actual ones. This is likely due to difficulties of extrapolating 2015 HBS data to 2022, with the SSB tax being introduced in this time period.

Table 9: Observed tax revenues from existing soft drink taxes vs. simulated tax revenues

Country	Revenues 2021 (in Mio. €)	Simulated revenues (in Mio. €)	Suspected cause of deviation
Belgium	164.1	96.2	Scope is broader than just SSB (e.g. artificial sweeteners)
Croatia	32.6	8.9	Scope is broader than just SSB (e.g. coffee)
Finland	221	58.8	Scope is broader than just SSB (e.g. artificial sweeteners)
France	454	196.2	Poor coverage in HBS
Hungary	185.1	16.3	Scope is broader than just SSB (e.g. additional tax on salty foods and energy drinks), poor coverage in HBS
Ireland	30.6	22.4	Non-consideration of on-trade consumption
Latvia	22	4.1	Poor coverage in HBS
Netherlands	268	133.9	Scope is broader than just SSB (e.g. artificial sweeteners)
Poland	322.7	222.3	Non-consideration of on trade consumption
Portugal	52	33.8	Non-consideration of on trade consumption
Catalonia (Spain)	29.9	48.5	Difficulties to extrapolate data from 2015

Source: For the 2021 revenues, see notes in Table 2, Simulated revenues; WIFO based on HBS and Euromonitor data.

These discrepancies between actual tax revenues and simulated revenues indicate that our simulations are only covering part of the taxable SSB consumption. Consequently, the simulation results can be interpreted as conservative estimates.

4.2.3. Assumptions for the simulation

The simulation of the potential effects of an EU harmonised SSB tax requires some additional modelling assumptions regarding the national implementation of the EU harmonised SSB tax, the price pass-through, product reformulation, and the demand elasticities.

National implementation: It is assumed that Member States implement the exact minimum excise taxation. Member States with existing higher excise taxes do not adjust their existing tax system downwards. Member States with an existing soft drink tax system with rates below the minimum tax increase up to the minimum tax rate. For Catalonia, we assume that the regional SSB tax will be replaced by a national tax applicable in all Spanish regions at the relevant minimum tax rates.

Price pass-through: For the largest seven Member States, we assume 100% pass-through. For the 20 smaller Member States we assume 85%. Amongst others, this is based on the finding that Poland appears to have experienced a full pass-through, while Belgium, as a smaller jurisdiction, has only experienced a less than full pass-through.

Product reformulation and within product substitution: Product reformulation and within product substitution lead to identical outcomes for the purpose of our simulation.[378] Whether consumers substitute to (now relatively cheaper) products with lower sugar content or whether producers reduce the sugar content to be able to set relatively lower prices, the outcome is the same: the share of products with lower sugar content is increasing if products with higher sugar content are taxed (at a higher rate). We model this by using an elasticity of 0.5 with respect to the relative price changes. Accordingly, a one percent price increase for drinks with a higher sugar content leads to a reduction of the consumption share of 0.5 percent. It is, however, not possible to disentangle the consumer substitution effect from the product reformulation effect.

Demand elasticities: The key parameter for consumer behaviour is the demand elasticity, i.e. by how many percent does the quantity consumed react in response to a one percent increase in price (see Annex III for details). In principle it would be possible to model different demand elasticities for different households or consumer types. However, for smaller countries this would very quickly result in a low number of observations as a basis to estimate the demand elasticities. Therefore, we opt for country-specific demand elasticities. This still implicitly models household specific consumer reactions because different household types experience different price changes. Most notably, the stylised fact that households with higher incomes tend to buy more expensive soft drinks and that heavy consumers tend to buy cheaper soft drinks results in systematic variation in the consumer reactions.

The country specific demand elasticities are estimated using a quadratic almost ideal demand system for all those Member States where the HBS data allows such

[378] We use the term 'within product substitution' to describe the switch to different varieties of the same product. In the context of our study this is a switch from carbonates with very high sugar content to carbonates with less sugar content or reduced sugar carbonates. This substitution would otherwise not be covered when modelling the own- and cross price elasticities for the broader product groups (soft drinks, juices and bottled water) available in the HBS data.

an estimation.[379] The resulting uncompensated own- and cross-price elasticities for bottled water, juices and soft drinks are then predicted for all Member States using a simple OLS regression on country size, income and per capita consumption of the relevant soft drinks.[380] This results in a complete matrix for demand elasticities as reported in Table 10.

Table 10: Own- and cross-price elasticities used for the simulation

Country	*Soft drinks own elasticity*	*Juices own elasticity*	*soft to water cross elasticity*	*soft to juice cross elasticity*	*juice to soft cross elasticity*	*juice to water cross elasticity*
AT	-1.26	-1.34	0.12	0.22	0.14	0.14
BE	-1.18	-1.29	0.07	-0.03	0.07	0.13
BG	-1.40	-1.13	0.07	-0.48	0.06	0.05
CY	-1.50	-1.12	0.13	0.08	0.13	0.11
CZ	-1.35	-1.32	0.13	-0.01	0.13	0.16
DE	-1.09	-1.40	0.11	0.15	0.18	0.15
DK	-1.23	-1.32	0.10	0.16	0.09	0.10
EE	-1.50	-0.95	0.12	-0.04	0.19	-0.01
EL	-1.39	-1.36	0.16	0.17	0.18	0.16
ES	-1.20	-1.46	0.13	0.11	0.15	0.21
FI	-1.29	-1.05	0.13	0.21	0.23	-0.06
FR	-1.20	-1.41	0.18	0.40	0.27	0.16
HR	-1.45	-1.18	0.13	-0.08	0.14	0.10
HU	-1.38	-1.18	0.11	-0.13	0.15	0.14
IE	-1.25	-1.31	0.09	0.10	0.07	0.12
IT	-1.23	-1.57	0.17	0.36	0.21	0.29
LT	-1.48	-1.17	0.14	-0.01	0.16	0.08
LU	-1.33	-1.01	0.06	0.09	0.08	0.03
LV	-1.50	-1.13	0.13	-0.03	0.14	0.09
MT	-1.53	-1.06	0.12	0.05	0.11	0.10
NL	-1.21	-1.19	0.13	0.22	0.22	-0.01
PL	-1.31	-1.20	0.14	-0.07	0.23	0.05
PT	-1.39	-1.34	0.17	0.20	0.20	0.16
RO	-1.34	-1.34	0.10	-0.27	0.08	0.15
SE	-1.23	-1.26	0.13	0.26	0.18	0.04
SI	-1.47	-1.17	0.14	0.11	0.16	0.10
SK	-1.37	-1.27	0.10	-0.13	0.08	0.16

Source: WIFO estimates based on HBS and Euromonitor data.

[379] Belgium, Czechia, Estonia, Greece, Spain, Finland, Croatia, Hungary, Luxembourg, Latvia, Poland, Portugal, Romania, Slovenia, and Slovakia.

[380] Note that 'juices' refers to the definition of juices in the HBS data, i.e. includes juices and nectars. For the rest of the simulation results tables, we will refer to the 'juices' in the HBS data as 'juices and nectars' and report the averaged impact.

The most relevant own-price elasticities for soft drinks vary between –1.09 for Germany and –1.53 for Malta, reflecting that smaller Member States tend to face more elastic demand due to cross-border shopping opportunities.[381] The cross-price elasticities are by and large positive and mostly in the range between 0.1 and 0.2 indicating a small substitution effect towards juices and bottled water.

4.2.4. Simulation results

Induced price changes

Table 11 to Table 13 summarise the induced price changes for the broad drink categories as percentages of the original price. These price changes already account for product reformulation or within product substitution and price pass-through.

The introduction of an EU harmonised SSB tax with a minimum tax rate of €2 per hl in scenario 1 would affect 18 out of 27 Member States (Table 11). The largest price effects would be observed for carbonates in Slovakia, Romania and Greece with an increase of around four percent. For other Member States affected the price increases only lie around 0.5 to two percent. Because of the high baseline prices, the relative increase is smaller for energy drinks and RTD teas despite a larger share of energy drinks falling under the scope of the harmonised SSB tax. Likewise, the relative price increase for carbonates is higher because of the low baseline price.

Table 11: Scenario 1 - Price changes (in %) by EU Member State

Country	*Energy drinks*	*RTD teas*	*Carbonates*	*Juices and nectars*
AT	0.50	0.92	1.11	0.28
BE	0.00	0.00	0.00	0.00
BG	0.44	0.85	1.92	0.41
CY	0.46	0.78	1.94	0.32
CZ	0.75	1.14	2.46	0.26
DE	0.66	1.63	2.03	0.44
DK	0.42	0.46	1.06	0.22
EE	0.50	0.80	2.33	0.42
EL	0.55	0.60	3.75	0.50
ES	-0.55	-0.43	-1.01	-0.40
FI	0.00	0.00	0.00	0.00
FR	0.00	0.00	0.00	0.00
HR	0.00	0.00	0.00	0.00
HU	0.00	0.00	0.00	0.00
IE	0.00	0.00	0.00	0.00
IT	0.57	1.43	1.91	0.40
LT	0.62	1.01	1.18	0.27
LU	0.46	0.76	1.66	0.29

381 Malta as an island is likely to be less susceptible to cross-border shopping. However, since the country size – likely because of the cross-border shopping opportunities – is the dominant predictor for the extrapolation of the demand elasticities we use the cross-border argument to explain the variation. See Annex 3 for more detail on the derivation of the demand elasticities.

Country	Energy drinks	RTD teas	Carbonates	Juices and nectars
LV	0.00	0.00	0.00	0.00
MT	0.52	0.88	2.17	0.35
NL	0.00	0.00	0.00	0.00
PL	0.00	0.00	0.00	0.00
PT	0.00	0.00	0.00	0.48
RO	0.74	1.59	4.05	0.36
SE	0.35	0.49	0.80	0.22
SI	0.46	1.31	2.35	0.42
SK	0.69	1.07	4.43	0.56
Total	**0.27**	**0.65**	**1.20**	**0.16**

Source: WIFO estimates based on HBS and Euromonitor data.

A decrease in prices would be observed in Spain because the regional SSB tax in Catalonia would be replaced – per assumption – with a lower tax covering all Spanish regions. This would translate into on average moderate price decrease in the range of 0.4 (for juices and nectars) to a one percent decrease for carbonates.[382]

The introduction of an EU harmonised SSB tax with a minimum tax rate of €11 per hl in scenario 2 would affect 23 out of 27 Member States (Table 12). The largest effects on prices with increases in the range of 20 percent and more would be observed for carbonates in Slovakia, Romania and Greece, reflecting the low baseline price level in these countries. For several other Member States affected the price increases for carbonates still range from around five to 15 percent. Because of the high baseline prices, the relative increase is smaller for energy drinks and RTD teas despite a larger share of energy drinks falling under the scope of the harmonised SSB tax. For juices and nectars, the relative price increase is only moderate because only a small fraction falls into the scope of the EU harmonised SSB tax.

Table 12: Scenario 2 - Price changes (in %) by EU Member State

Country	Energy drinks	RTD teas	Carbonates	Juices and nectars
AT	2.71	4.81	5.98	1.54
BE	0.00	0.00	0.00	0.00
BG	2.38	4.49	10.08	2.23
CY	2.51	4.11	10.23	1.77
CZ	4.04	5.88	13.13	1.43
DE	3.60	8.20	10.66	2.43
DK	2.30	2.48	5.68	1.21
EE	2.72	4.20	12.31	2.29
EL	3.01	3.21	19.82	2.73
ES	2.45	4.54	8.63	2.45
FI	0.00	0.00	0.00	0.00

[382] In other words, the effect of the strong tax reductions for the 3,919 Catalan households dominates the moderate price increase for the 17,687 households in other Spanish regions.

Country	Energy drinks	RTD teas	Carbonates	Juices and nectars
FR	0.00	0.92	0.15	0.00
HR	0.09	0.97	1.48	0.09
HU	0.00	5.35	14.75	3.90
IE	0.00	0.00	0.00	0.00
IT	3.09	7.27	10.02	2.19
LT	3.35	5.25	6.30	1.50
LU	2.49	4.02	8.99	1.59
LV	0.00	0.86	0.18	0.00
MT	2.81	4.60	11.38	1.92
NL	0.52	1.26	1.82	0.56
PL	0.00	0.00	0.00	0.00
PT	0.00	0.94	0.58	2.64
RO	4.01	8.05	21.01	1.99
SE	1.93	2.61	4.35	1.18
SI	2.49	6.75	12.59	2.33
SK	3.71	5.56	22.75	3.07
Total	**1.96**	**4.15**	**7.92**	**1.41**

Source: WIFO estimates based on HBS and Euromonitor data.

The introduction of an EU harmonised SSB tax with two-tiered minimum tax rates of €10 and €15 per hl in scenario 3 would affect 25 out of 27 Member States (Table 13). The largest effects on prices with increases between 20 and 30 percent would still be observed for carbonates in Slovakia, Romania and Greece, reflecting the low baseline price level in these countries. However, for Hungary such a large price increase would also be found for carbonates. For most Member States the price increases for carbonates would now be more than 10 percent. In contrast, because of the high baseline prices, the relative increase is smaller for energy drinks and would still only be up to five percent. For juices and nectars, the relative price increase would also remain only moderate because of the small fraction falling into the scope of the EU harmonised SSB tax.

Table 13: Scenario 3 - Price changes (in %) by EU Member State

Country	Energy drinks	RTD teas	Carbonates	Juices and nectars
AT	3.68	5.49	7.64	2.11
BE	0.87	0.61	1.57	0.52
BG	3.23	5.13	13.60	3.04
CY	3.41	4.69	13.50	2.41
CZ	5.47	6.73	17.08	1.95
DE	4.88	9.41	13.86	3.31
DK	3.13	2.83	7.71	1.65
EE	3.69	4.80	15.92	3.12
EL	4.08	3.66	26.71	3.72

Country	Energy drinks	RTD teas	Carbonates	Juices and nectars
ES	3.75	5.41	12.18	3.71
FI	0.00	0.00	0.00	0.00
FR	0.00	0.86	0.63	0.15
HR	1.01	1.61	6.70	0.96
HU	0.00	6.73	23.83	5.63
IE	0.00	0.00	0.00	0.00
IT	4.19	8.33	12.64	2.98
LT	4.54	6.01	8.04	2.05
LU	3.38	4.59	11.42	2.17
LV	0.37	0.87	1.15	0.26
MT	3.81	5.26	15.05	2.62
NL	1.46	2.06	4.51	1.60
PL	0.00	0.00	0.20	0.00
PT	0.00	0.57	0.35	3.60
RO	5.43	9.24	27.90	2.71
SE	2.63	2.97	5.82	1.61
SI	3.39	7.72	16.31	3.18
SK	5.02	6.36	29.56	4.18
Total	**2.77**	**4.81**	**10.74**	**2.05**

Source: WIFO estimates based on HBS and Euromonitor data.

Induced quantity changes:

Table 14 to Table 16 summarise the induced quantity changes for the detailed drink categories as a percentage of the original quantity. The quantity reductions broadly follow the relative price changes, with reductions in the range from 0.5 percent up to more than four percent for regular sugar-sweetened carbonates in Slovakia. There are, however, some countries like Romania or Greece where the prices changes translate to less reduction in quantities because of their market structure or demand elasticities. The induced quantity changes for energy drinks or juices are relatively small reflecting the smaller induced price increase.

Table 14: Scenario 1 - Quantity changes (in %) by EU Member State

Country	Carbonates		Energy drinks	RTD teas	Juices and nectars	Water
	regular sugar	reduced sugar				
AT	-0.67	-0.53	-0.35	-0.69	-0.10	0.44
BE	0.00	0.00	0.00	0.00	0.00	0.21
BG	-1.69	-0.96	-0.39	-0.7	-1.35	1.26
CY	-1.73	-0.90	-0.46	-0.82	-0.19	0.45
CZ	-2.95	-0.66	-0.95	-1.38	-0.29	0.61
DE	-1.89	-0.99	-0.54	-1.76	-0.41	0.35
DK	-0.88	-0.51	-0.45	-0.46	-0.11	4.10

Country	Carbonates		Energy drinks	RTD teas	Juices and nectars	Water
	regular sugar	reduced sugar				
EE	-2.44	-0.84	-0.50	-0.81	-0.35	0.51
EL	-2.40	-1.06	-0.36	-0.38	-0.04	0.36
ES	0.82	0.01	0.48	0.32	0.38	0.23
FI	0.00	0.00	0.00	0.00	0.00	1.01
FR	0.00	0.00	0.00	0.00	0.00	0.21
HR	0.00	0.00	0.00	0.00	0.00	0.27
HU	0.00	0.00	0.00	0.00	0.00	0.20
IE	0.00	0.00	0.00	0.00	0.00	0.80
IT	-1.22	-0.96	-0.37	-0.93	0.02	0.10
LT	-1.00	-0.59	-0.51	-0.89	-0.15	0.91
LU	-1.68	-0.39	-0.39	-0.68	-0.12	0.09
LV	0.00	0.00	0.00	0.00	0.00	0.21
MT	-1.84	-1.01	-0.50	-0.91	-0.22	0.26
NL	0.00	0.00	0.00	0.00	0.00	1.77
PL	0.00	0.00	0.00	0.00	0.00	0.30
PT	0.03	0.00	0.04	0.03	-0.39	0.09
RO	-0.18	-1.77	-0.04	-0.08	-0.55	0.01
SE	-0.41	-0.38	-0.20	-0.30	-0.06	3.31
SI	-2.14	-0.56	-0.37	-1.23	-0.21	0.26
SK	-4.26	-1.46	-0.61	-1.00	-1.00	0.29
Total	**-0.74**	**-0.41**	**-0.14**	**-0.59**	**-0.10**	**0.26**

Source: WIFO estimates based on HBS and Euromonitor data.

In line with the relative price changes in Table 11 adverse effects in scenario 1 are found for Spain, where the extension of the SSB tax to all Spanish regions will result in a simulated increase in consumption of 0.8 percent of regular sugar-sweetened carbonates because the strong reduction in the tax burden in Catalonia dominates the moderate tax increase in the other Spanish regions.

The quantity changes under scenario 2 as summarised in Table 15 show the biggest extent for regular carbonates in Czechia (-15.7 percent) and Slovakia (-21.9 percent), where the large price change meets an elastic demand. With the higher minimum tax, there is also a stronger observable reduction in the quantities for RTD teas, with the strongest reduction in Germany (-8.8 percent) and Czechia (-7.1 percent). The induced quantity changes for energy drinks or juices are relatively small reflecting the smaller induced price increase.

Table 15: Scenario 2 - Quantity changes (in %) by EU Member State

Country	Carbonates		Energy drinks	RTD teas	Juices and nectars	Water
	regular sugar	reduced sugar				
AT	-3.61	-2.94	-1.91	-3.62	-0.57	0.45
BE	0.00	0.00	0.00	0.00	0.00	0.21
BG	-8.89	-5.26	-2.11	-4.04	-7.21	1.27

Country	Carbonates		Energy drinks	RTD teas	Juices and nectars	Water
	regular sugar	reduced sugar				
CY	-9.10	-4.93	-2.52	-4.34	-1.07	0.46
CZ	-15.72	-3.63	-5.15	-7.13	-1.61	0.62
DE	-9.90	-5.47	-2.95	-8.83	-2.32	0.35
DK	-4.72	-2.81	-2.47	-2.49	-0.60	4.12
EE	-12.88	-4.62	-2.69	-4.27	-1.92	0.52
EL	-12.68	-5.01	-1.94	-2.03	-0.27	0.37
ES	-7.34	-3.49	-1.64	-3.66	-2.45	0.24
FI	0.00	0.00	0.00	0.00	0.00	1.01
FR	-0.12	-1.03	0.00	-0.81	0.02	0.21
HR	-1.49	-2.92	-0.09	-1.00	-0.10	0.27
HU	-10.43	-6.70	0.30	-3.97	-3.02	0.21
IE	0.00	0.00	0.00	0.00	0.00	0.80
IT	-6.42	-5.26	-2.01	-4.74	0.02	0.10
LT	-5.33	-3.23	-2.75	-4.64	-0.82	0.91
LU	-9.08	-2.14	-2.11	-3.59	-0.68	0.09
LV	-0.15	-1.54	0.00	-0.75	0.00	0.21
MT	-9.63	-5.56	-2.71	-4.80	-1.26	0.27
NL	-1.04	-0.80	-0.31	-0.89	-0.19	1.77
PL	0.00	0.00	0.00	0.00	0.00	0.30
PT	-0.07	-0.70	0.20	-0.33	-2.09	0.09
RO	-0.95	-7.47	-0.20	-0.39	-2.89	0.01
SE	-2.21	-2.10	-1.11	-1.59	-0.35	3.33
SI	-11.48	-3.09	-2.03	-6.32	-1.19	0.27
SK	-21.87	-8.03	-3.28	-5.21	-5.35	0.30
Total	**-5.19**	**-2.88**	**-0.96**	**-3.57**	**-1.00**	**0.26**

Source: WIFO estimates based on HBS and Euromonitor data.

Table 16 shows the quantity changes under scenario 3 with the two-tiered minimum tax. The ranking of the quantity reductions for regular sugar-sweetened carbonates is broadly stable, but the effects are even more pronounced with a reduction of 20.4 percent in Czechia and 28.4 percent in Slovakia. In comparison to scenario 2 the quantity reduction increases for all products apart from reduced sugar carbonates which now only see a small reduction in quantity. With the higher minimum tax, there is also a noticeable stronger reduction in the quantities of RTD teas, with the strongest reduction in Germany (-10 percent) and Czechia (-8.1 percent). The induced quantity changes for energy drinks or juices are still relatively small reflecting the smaller induced price increase.

Table 16: Scenario 3 - Quantity changes (in %) by EU Member States

Country	Carbonates		Energy drinks	RTD teas	Juices and nectars	Water
	regular sugar	reduced sugar				
AT	-4.60	-1.34	-2.59	-4.11	-0.85	with0.45

Country	Carbonates		Energy drinks	RTD teas	Juices and nectars	Water
	regular sugar	reduced sugar				
BE	-1.45	0.58	-0.74	-0.51	-0.65	0.21
BG	-11.99	-2.39	-2.86	-4.60	-9.77	1.27
CY	-12.01	-2.24	-3.42	-4.91	-1.49	0.46
CZ	-20.44	-1.65	-6.97	-8.12	-2.18	0.63
DE	-12.84	-2.49	-3.99	-10.04	-3.26	0.35
DK	-6.40	-1.28	-3.36	-2.81	-0.82	4.13
EE	-16.63	-2.10	-3.65	-4.81	-2.60	0.52
EL	-17.08	-2.65	-2.63	-2.26	-0.39	0.38
ES	-10.33	-1.55	-2.57	-4.27	-3.78	0.24
FI	0.00	0.00	0.00	0.00	0.00	1.01
FR	-0.50	-0.44	0.03	-0.73	0.01	0.21
HR	-6.68	-1.57	-0.99	-1.58	-0.78	0.27
HU	-16.91	-5.03	0.43	-4.93	-4.49	0.21
IE	0.00	0.00	0.00	0.00	0.00	0.80
IT	-8.07	-2.39	-2.72	-5.38	-0.23	0.10
LT	-6.79	-1.47	-3.72	-5.28	-1.11	0.92
LU	-11.52	-0.97	-2.87	-4.08	-0.97	0.09
LV	-0.95	-1.80	-0.32	-0.74	-0.17	0.21
MT	-12.73	-2.53	-3.68	-5.45	-1.73	0.27
NL	-2.56	1.42	-0.87	-1.36	-0.63	1.78
PL	-0.17	0.16	0.00	0.00	-0.01	0.30
PT	0.10	-0.86	0.28	-0.06	-2.90	0.09
RO	-1.26	-4.42	-0.28	-0.45	-3.87	0.01
SE	-2.96	-0.95	-1.51	-1.79	-0.49	3.33
SI	-14.85	-1.40	-2.76	-7.19	-1.69	0.27
SK	-28.42	-3.65	-4.44	-5.92	-7.16	0.30
Total	**-7.06**	**-1.05**	**-1.39**	**-4.09**	**-1.52**	**0.26**

Source: WIFO estimates based on HBS and Euromonitor data.

Change in daily sugar intake

Table 17 summarises the average daily sugar intake through the consumption of SSBs by Member States. The baseline sugar intake is compared to simulated sugar intake under the three scenarios.

The average daily sugar intake is reduced by 0.1 grams from 6.72 to 6.67 in scenario 1, which represents a 0.9 percent reduction. The strongest effect in this scenario is found in Slovakia with a reduction of about four percent, while there is a weak increase for Spain, which is again reflecting the regional tax reduction in Catalonia, which is replaced by a national SSB tax. In scenarios 2 and 3 the reduction in the average daily sugar intake is strong, at -5.6 and -7.2 percent, respectively. The strongest effects are in line with the quantity reductions for Slovakia and Czechia. Interestingly, Portugal is the only country where scenario 3

results in a smaller reduction in the average daily sugar intake compared to scenario 2. This is due to a change in the relative progressivity of the tax schedule which results in a change in product reformulations.

Table 17: Average daily sugar intake (in grams) by EU Member State, Baseline and three scenarios

Country	Baseline	Scenario 1		Scenario 2		Scenario 3	
		absolute value	% reduction	absolute value	% reduction	absolute value	% reduction
AT	9.33	9.26	-0.78	8.94	-4.17	8.86	-5.11
BE	9.37	9.37	0.00	9.37	0.00	9.26	-1.23
BG	3.29	3.22	-2.00	2.94	-10.45	2.85	-13.30
CY	11.50	11.30	-1.74	10.45	-9.14	10.18	-11.50
CZ	3.59	3.49	-2.65	3.09	-13.93	2.95	-17.75
DE	7.50	7.34	-2.12	6.68	-10.99	6.48	-13.63
DK	7.76	7.69	-0.92	7.38	-4.93	7.27	-6.31
EE	4.88	4.78	-2.07	4.36	-10.83	4.22	-13.56
EL	3.71	3.64	-1.78	3.37	-9.00	3.27	-11.91
ES	6.11	6.15	0.78	5.67	-7.22	5.52	-9.61
FI	5.29	5.29	0.00	5.29	0.00	5.29	0.00
FR	5.26	5.26	0.00	5.24	-0.45	5.24	-0.39
HR	5.48	5.48	0.00	5.36	-2.30	5.18	-5.54
HU	7.19	7.19	0.00	6.61	-7.99	6.38	-11.18
IE	4.81	4.81	0.00	4.81	0.00	4.81	0.00
IT	6.66	6.57	-1.37	6.18	-7.21	6.08	-8.70
LT	2.26	2.24	-0.95	2.15	-5.05	2.12	-6.22
LU	6.68	6.60	-1.13	6.27	-6.08	6.17	-7.61
LV	3.25	3.25	0.00	3.22	-0.79	3.22	-1.00
MT	12.77	12.52	-1.96	11.46	-10.24	11.13	-12.83
NL	9.63	9.63	0.00	9.54	-0.97	9.43	-2.13
PL	8.12	8.12	0.00	8.12	0.00	8.11	-0.12
PT	4.92	4.92	-0.02	4.89	-0.75	4.91	-0.37
RO	4.97	4.91	-1.20	4.71	-5.22	4.61	-7.39
SE	4.22	4.19	-0.52	4.10	-2.83	4.07	-3.53
SI	6.48	6.37	-1.76	5.87	-9.34	5.71	-11.80
SK	7.86	7.54	-4.08	6.24	-20.56	5.84	-25.74
Total	**6.72**	**6.67**	**-0.87**	**6.35**	**-5.58**	**6.24**	**-7.21**

Source: WIFO estimates based on HBS and Euromonitor data.

Table 18 also breaks down the change in the average daily sugar intake by household types. All scenarios see the strongest reduction in households in the lowest income quintile, but the difference is most pronounced for scenario 1. Single households tend to experience small reductions in average daily sugar intake in all scenarios. Interestingly, households with children see the relatively strongest reduction in scenario 1 and the relatively lowest reduction in scenarios 2 and 3. This indicates that the effects according to household types are not uniform across Member States.

Table 18: Change in average daily sugar intake (in grams) by household types, three scenarios

Household type	Income quintile (equivalised OECD income)					
	1st	2nd	3rd	4th	5th	Total
% reduction in average daily sugar intake: Scenario 1						
Single male	-1.05	-0.93	-0.91	-0.82	-0.71	**-0.89**
Single female	-1.10	-0.95	-0.73	-0.85	-0.91	**-0.92**
Households with children	-0.40	-0.69	-0.86	-0.85	-0.87	**-0.74**
Household without children	-0.92	-0.85	-0.87	-0.90	-0.94	**-0.90**
Total	**-0.86**	**-0.84**	**-0.85**	**-0.88**	**-0.90**	**-0.87**
% reduction in average daily sugar intake: Scenario 2						
Single male	-5.89	-5.42	-5.38	-4.98	-4.81	**-5.31**
Single female	-6.16	-5.46	-5.20	-5.43	-5.31	**-5.56**
Households with children	-4.41	-5.05	-5.55	-5.53	-5.24	**-5.17**
Household without children	-6.46	-5.80	-5.80	-5.73	-5.78	**-5.86**
Total	**-5.78**	**-5.50**	**-5.60**	**-5.56**	**-5.50**	**-5.58**
% reduction in average daily sugar intake: Scenario 3						
Single male	-7.41	-6.87	-6.84	-6.43	-6.32	**-6.80**
Single female	-7.82	-6.98	-6.80	-7.15	-6.94	**-7.18**
Households with children	-5.88	-6.62	-7.20	-7.15	-6.83	**-6.75**
Household without children	-8.32	-7.45	-7.46	-7.38	-7.51	**-7.55**
Total	**-7.43**	**-7.08**	**-7.22**	**-7.19**	**-7.16**	**-7.21**

Source: WIFO estimates based on HBS and Euromonitor data.

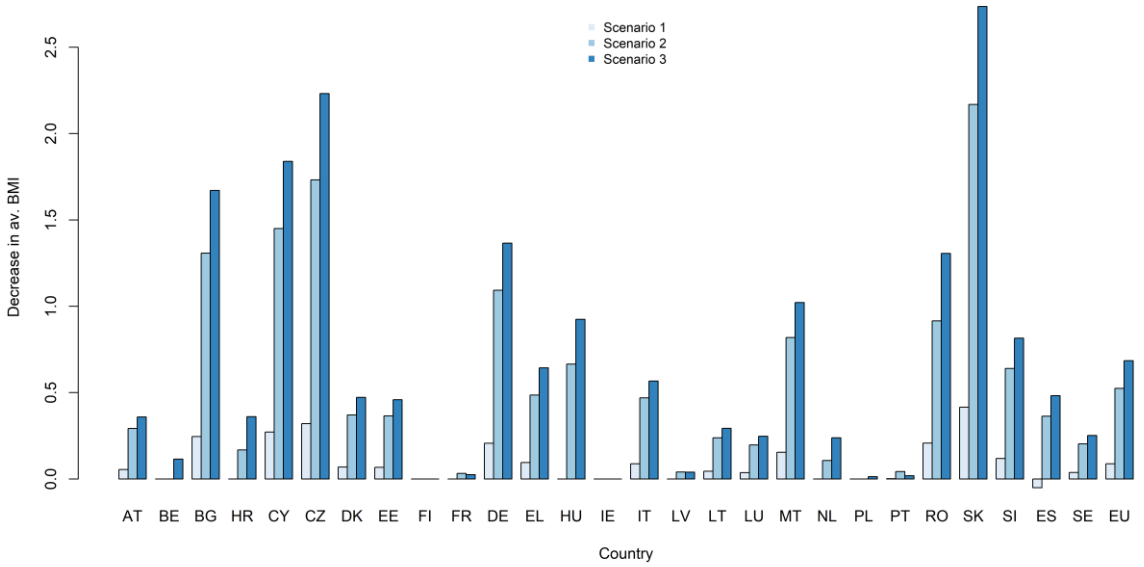
Health effects potential

Higher taxation rates result in higher reductions in daily caloric intake. The effects on sugar consumption in Table 17 can be directly translated into a reduction in caloric intake (as one gram of sugar equals four kcal). Averaged across countries in the EU, **the reduction in daily kcals consumed is 0.3 in Scenario 1, 1.7 in Scenario 2 and 2.1 in Scenario 3.** These results are relatively modest compared to the average daily caloric intake: the advised caloric intake per day is 2000 kcal for women and 2500 for men. [383]

Averaged across all EU countries, **the resulting decrease in average BMI among the adult population ranges from 0.01 in Scenario 1 and 0.04 in Scenario 2, to 0.05 in Scenario 3**. These estimates assume that the reductions in caloric intake are persistent. Figure 29 shows the reductions in average BMI across countries and scenarios.

[383] EFSA. (2013). Scientific Opinion on Dietary Reference Values for energy. *EFSA Journal*, *11*(1), 3005. https://doi.org/10.2903/j.efsa.2013.3005

Figure 29: Effects of a harmonised tax on average BMI of adults - across countries and scenarios



Source: ECORYS estimates based on HBS and EHIS data.

The decreases in BMI across the populations can have an effect on the incidence of specific diseases. We focus here on diabetes type 2 and ischemic heart disease (IHD), for which there is strong evidence that they are associated with high sugar intake and for which we have reliable estimates of the relationship between BMI and incidence.[384] Type 2 diabetes mellitus is a progressive disorder defined by deficits in insulin secretion and action that lead to abnormal glucose metabolism and related metabolic derangements.[385] IHD, or coronary heart disease is a type of heart disease where the arteries of the heart cannot deliver enough oxygen-rich blood to the heart[386].

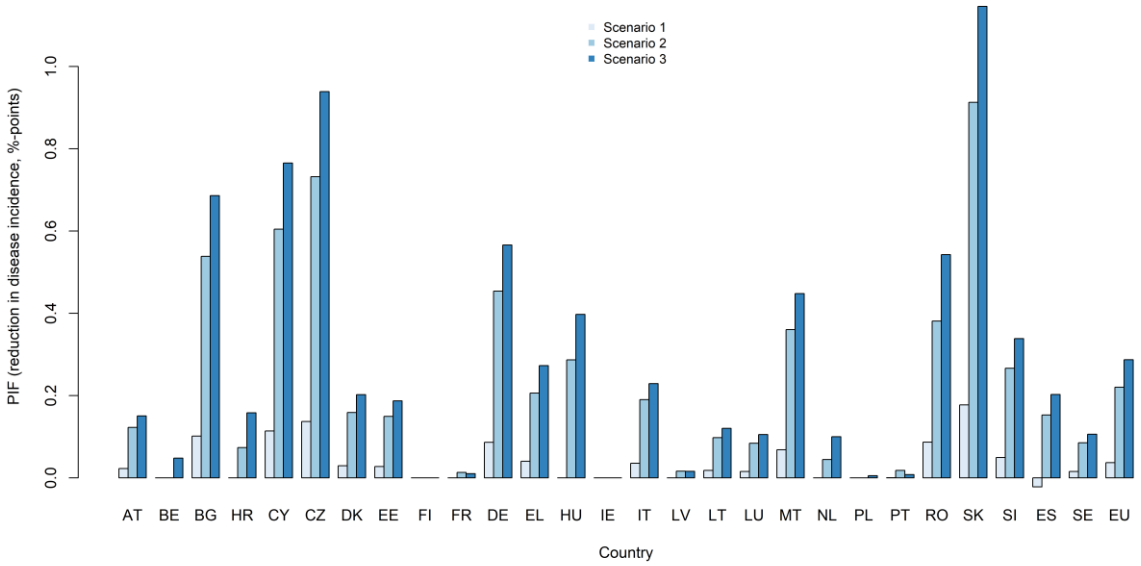
Figures 30 and 31 show the reduction in disease incidence (as measured by the Partial Impact Factor, PIF) across scenarios and countries. Averaged across the EU, **scenario 1 leads to a reduction of 0.05 percent in the incidence of IHD and 0.1 percent in the incidence of diabetes. Scenario 2 leads to a reduction of 0.2 percent in the incidence of IHD and 0.5 percent in the incidence of diabetes. Scenario 3 leads to a reduction of 0.3 percent in the incidence of IHD and 0.7 percent in the incidence of diabetes.** There is considerable variation across countries, which is caused by the variation in effects on consumption and differences in the current distribution of BMI within the populations.

Figure 30: Reduction (%) in the annual incidence of IHD associated with the reduction in BMI across countries and scenarios

[384] Turck, D., Bohn, T., Castenmiller, J., de Henauw, S., Hirsch-Ernst, K. I., Knutsen, H. K., Maciuk, A., Mangelsdorf, I., McArdle, H. J., Naska, A., Peláez, C., Pentieva, K., Siani, A., Thies, F., Tsabouri, S., Adan, R., Emmett, P., Galli, C., Kersting, M., … Vinceti, M. (2022). Tolerable upper intake level for dietary sugars. EFSA Journal, 20(2). https://doi.org/10.2903/j.efsa.2022.7074

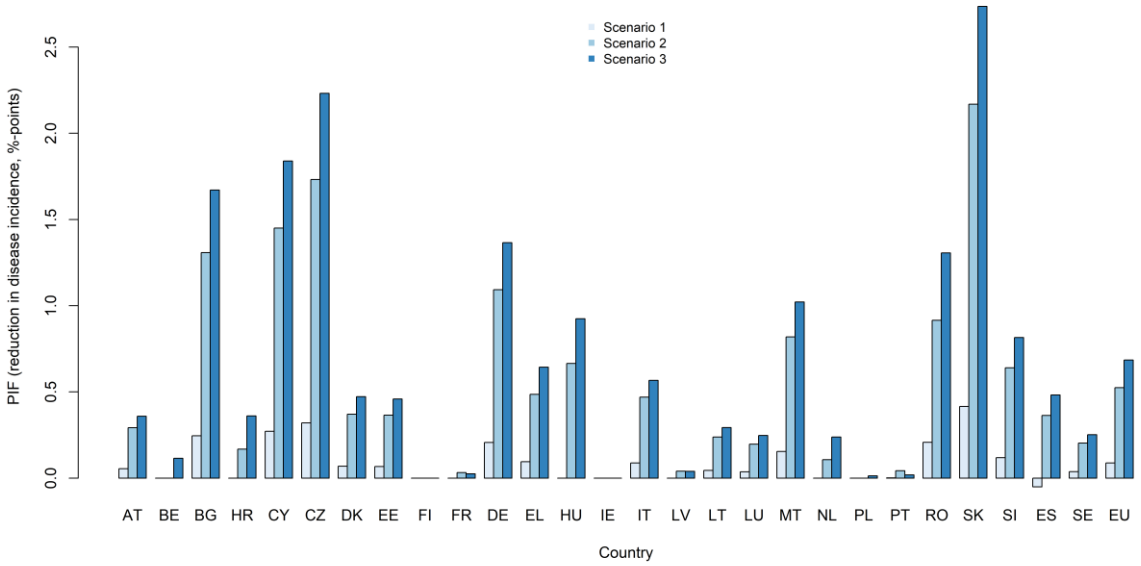
[385] Meigs, J. B., Muller, D. C., Nathan, D. M., Blake, D. R., & Andres, R. (2003). The Natural History of Progression From Normal Glucose Tolerance to Type 2 Diabetes in the Baltimore Longitudinal Study of Aging. Diabetes, 52(6), 1475–1484. https://doi.org/10.2337/diabetes.52.6.1475

[386] https://www.nhlbi.nih.gov/health/coronary-heart-disease.



Source: Ecorys estimates based on HBS, EHIS, and GBD data

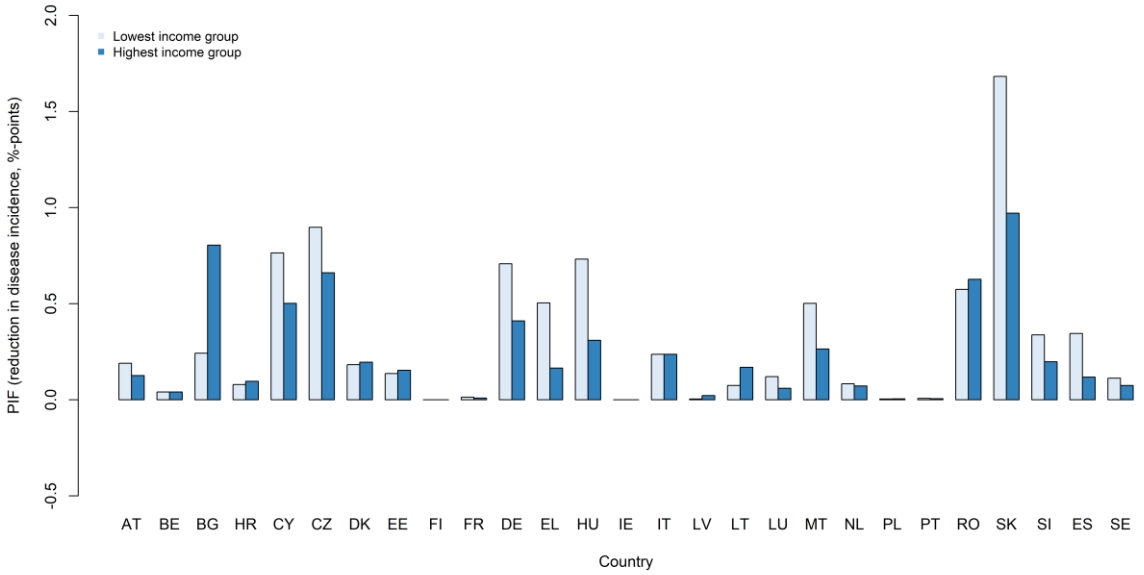
Figure 31: Reduction (%) in the annual incidence of diabetes associated with the reduction in BMI - across countries and scenarios



Source: Ecorys estimates based on HBS, EHIS, and GBD data

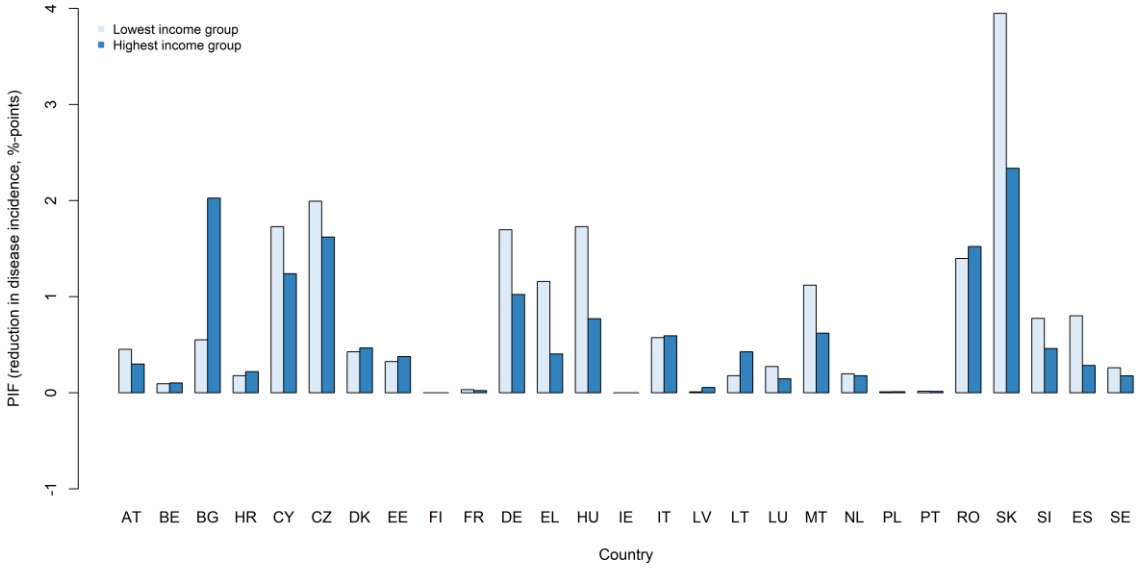
The health effects seem to be generally larger among the lower income groups. Figures 32 and 33 show the reductions in disease incidence for individuals in the lowest and highest income quintile in Scenario 3. We focus on this scenario, as the size of the effects is most pronounced. In most cases, the effects are largest for the lowest income group.

Figure 32: Reduction (%) in the annual incidence of IHD associated with the reduction in BMI in Scenario 3 - across countries and income groups (highest and lowest income quintile)



Source: ECORYS estimates based on HBS, EHIS, and GBD data

Figure 33: Reduction (%) in the annual incidence of diabetes associated with the reduction in BMI in Scenario 3 across countries and income groups (highest and lowest income quintile)



Source: ECORYS estimates based on HBS, EHIS, and GBD data

Tax revenue potential

Table 19 reports the results for the tax revenue simulations by Member State. The additional tax revenues under **scenario 1 amount to roughly 90m euros** with the largest fraction arising in Germany. In contrast, the additional tax revenues under **scenarios 2 and 3 are more substantial with an additional 670m euros and 902m euros respectively** - reflecting that the assumed minimum taxes in these scenarios are considerably higher. Note that these tax revenue

estimates are very conservative estimates because the simulation covers only a part of the tax scope.[387]

Table 19: Simulated tax revenues for 2021 (in millions of €) by EU Member State, Baseline and three scenarios

Country	*Baseline*	*Scenario 1*	*Scenario 2*	*Scenario 3*
AT	0.00	6.32	33.11	42.00
BE	96.18	96.18	96.18	105.82
BG	0.00	1.77	8.69	11.28
CY	0.00	0.72	3.61	4.64
CZ	0.00	2.62	12.74	16.08
DE	0.00	49.85	244.53	308.73
DK	0.00	3.53	18.49	24.63
EE	0.00	0.63	3.12	3.94
EL	0.00	2.69	13.50	17.62
ES	48.45	24.89	123.50	156.59
FI	58.75	58.75	58.75	58.75
FR	196.24	196.24	198.52	207.34
HR	8.91	8.91	9.43	11.83
HU	16.35	16.35	29.39	35.02
IE	22.43	22.43	22.43	22.43
IT	0.00	28.38	143.44	178.61
LT	0.00	0.60	3.15	4.05
LU	0.00	0.34	1.76	2.23
LV	4.14	4.14	4.16	4.41
MT	0.00	0.48	2.38	3.05
NL	133.87	133.87	147.39	169.20
PL	222.35	222.35	222.35	222.72
PT	33.79	34.34	37.97	38.69
RO	0.00	6.64	34.04	44.75
SE	0.00	3.45	18.40	24.49
SI	0.00	1.06	5.33	6.75
SK	0.00	3.29	14.40	17.46
Total	**841.47**	**930.83**	**1,510.75**	**1,743.12**

Source: WIFO estimates based on HBS and Euromonitor data.

[387] See Table 9 and the corresponding description for an approximation of the underrepresentation of the sample.

5. CONCLUSIONS AND STEPS FORWARD

5.1. Experiences with HFSS taxes in MS

From an economic theory perspective, the case for taxing HFSS products can be considered strong. It addresses negative externalities (effects on others not taken into account by the consumers and producers) and internalities (effects on own health insufficiently taken into account due to behavioural biases). Such externalities and internalities increase economic and social costs related to the consumption of these products, which provides a solid justification of efforts to discourage the intake of such products (especially so in great quantities and by vulnerable groups). While many HFSS taxes have been framed predominantly as public health measures, revenue generation still features as an additional motive for introducing such taxes for most countries.

To date, 11 EU Member States and one region (Catalonia) have introduced some form of HFSS taxation, with nine countries taxing SSBs solely (Belgium, Croatia, Finland, France, Ireland, Latvia, Netherlands, Poland, Portugal, and the Spanish region of Catalonia), one country taxing HFSS food products (Denmark: ice cream, chocolate and confectionary) and one country taxing both SSBs and snacks (Hungary). The majority of these taxes have been implemented for over a decade now. In addition, policy discussions or legislative drafts and initiatives also exist in other EU countries, from Czechia to Slovakia and Italy.

5.1.1 Effectiveness of HFSS taxes to date

Experiences collated from these Member States show that **SSB taxes can be considered a potentially effective policy instrument** for Member States that wish to pursue health policy goals. However, to be truly effective, such SSB taxes need to be carefully designed. Firstly, they should be levied at the central government level in the form of a specific excise tax (all Member States with SSB taxes have implemented them as a specific excise tax). Secondly, soft drinks with added sugar should be considered the basis for such taxes. The majority of the existing SSB taxes in the EU have a tax structure which is tiered based on sugar content. Whilst a progressive structure increases the complexity of the tax system, it also provides incentives for producers to reformulate their products which is considered an important mechanism to reduce the sugar intake.

The effectiveness of HFSS taxes depends on a number of factors. To achieve its objectives, any HFSS tax depends first of all on the **response from economic operators**, including aspects such as cost pass-through and product reformulation, much of it depending on the responses of individual companies (manufacturers, importers and retailers).

Though clear variations exist between jurisdictions studied, cost pass-through of HFSS taxes tends to be strong. However, much depends on the market structures and the strategies of economic operators (manufacturers as well as retailers). Cost pass-through tends to be lower in highly competitive markets and in smaller jurisdictions where cross-border shopping occurs. It can take several years before a HFSS tax is fully passed on to consumers.

Product reformulation can be considered a key response for manufacturers to adapt to the introduction of HFSS taxes. As a corollary, such a response is being anticipated in the design of a growing number of HFSS taxes. In countries with progressive SSB taxes, a reduction of the sugar content in the taxed products allows for the cushioning of the HFSS tax impact and can help to retain or increase market shares. Our research points to an effective reduction of the sugar content in countries with pronounced tiered/progressive SSB tax schemes, notably Poland and Portugal (less so in France). Such product reformulation lies entirely in the hands of manufacturers, and much depends on the characteristics (recipe) of the brands and their local specificities. There is no proof of spill-over effects in the form of such product reformulation being extended beyond the taxing jurisdiction.

Subsequently, a well-functioning HFSS tax is expected to trigger **reactions from consumers**, depending on the price elasticity and consumption behaviour including product substitution. Our own econometric analysis points to a strong variation of price elasticity amongst EU Member states studied, depending on the extent of the price increase. We found a somewhat lower price elasticity than the international literature. This may be due to the fact that our study focuses on high income countries, where sensitivity to price increases tends to be lower compared to developing or emerging countries. Measuring the impact of HFSS taxes on consumption behaviour is far from straightforward, as many variables are at play. However, in most EU countries studied, the consumption of SSB taxed drinks has decreased in comparison to other drinks if the tax is sufficiently high to trigger behavioural change. Such effects do not necessarily materialise in the short run but require a longer time span. This process of reduction in sugar intake can be reinforced by product reformulation, and by embedding SSB taxes in a broader set of health policy measures. In most countries studied, product substitution, i.e. smaller or larger shifts from taxed to non-taxed products, can be observed. Consumption increases typically for (non-taxed) low sugar drinks, fruit drinks, and mineral waters. These changes can take time to emerge. However, we have found no evidence that such trends would be reversed. Thus, once triggered, such changes in consumer behaviour tend to be structural in nature.

Concerning health impacts, the existing empirical evidence, confirmed by the consultation activities, suggests that the level of the tax and the pass-through onto consumer prices are important factors to induce behavioural change, and subsequent **positive health impacts**. The low(er) price of unhealthy foods, convenience of processed foods (notably ultra-processed food), and insufficient health measures in the marketing and promotion of healthier alternatives, are principal barriers to healthier dietary choices amongst consumers. SSB consumption is a modifiable risk factor for NCDs; however, the estimated health burden attributed to diets high in SSBs varies across EU Member States. The positive relationship between intake of SSBs and the probability of obesity, being overweight, having type 2 diabetes, hypertension, cardiovascular diseases, and several types of cancers is well documented. Data on the estimated health burden attributed to high SSB consumption ranges from 46 DALYs/100,000 in France to 246/100,000 in Bulgaria.

5.1.2 Efficiency and implementation aspects

The efficiency of HFSS taxes, including their unintended impacts, can be captured largely through the concepts of affordability, cross-border shopping and tax revenues.

With regard to **affordability**, whilst lower income households are known to spend higher shares of income on food and drinks and in particular on HFSS products, there is no clear differentiating pattern in the proportion of households that buy soft drinks by income group. Additional expenditures per household due to an SSB tax can be considered modest, varying from around EUR 2 per year in France (2019 revision) up to EUR 35 per year for top-income households in Poland.

Concerning **cross-border shopping** at EU level, we have found limited evidence, which can largely be linked to this phenomenon occurring between a few countries. Nevertheless, at the level of individual Member States, cross-border shopping can be noticed in certain hotspots, especially so in smaller jurisdictions (e.g., Belgium, Denmark and Portugal), where larger shares of consumers have access to more competitive offers across the border. However, it is difficult to isolate the role of HFSS taxes within such global differences of price baskets across Member States, as much can be attributed to overall differences in price, VAT, and so on.

In practice, **tax revenues** effectively generated by HFSS taxes tend to be lower than projected at the time of introduction. Ex ante evaluations do not always capture the changes in demand, product reformulation or product substitution that the HFSS tax itself triggers. Since these effects are desirable from a health perspective, low tax revenues due to these reasons must not be interpreted as inefficiency of the HFSS tax. In contrast, lower tax revenues because of cross-border trade, resulting in tax revenue leakage for the jurisdictions levying the tax are a source of inefficiency. Finally, tax fraud or tax evasion related to HFSS taxes has not been studied much and is difficult to measure.

5.1.3 Key elements for the design of HFSS taxes

Experiences collected from Member States show that **HFSS taxes can be considered a potentially effective policy instrument** for Member States that wish to pursue health policy goals. However, to be truly effective, such taxes need to be carefully designed. In short, when introducing or modifying such taxes the following key design features must be taken into account:

a) HFSS taxes should be introduced at **central government level**, thus strengthening the functioning of the tax by reducing leakage and fragmentation within individual Member States;

b) **Tax rates** should not be at very low levels because the resulting change in consumer behaviour and associated health benefits might be too small to be identified. For low levels of taxation, the additional compliance cost for firms and tax authorities are hard to justify.

c) HFSS taxes should be **nutrient- and not product-based**; this allows and encourages manufacturers to reconsider, modify and reformulate their products – which can help to achieve the desired health outcomes.

d) **Transition periods**: after the announcement of the introduction or the amendment of an HFSS tax, a time lag allows businesses to respond through product reformulation before the tax is actually implemented.

e) Tax schedules should be **tiered or progressive** according to the targeted nutrient content, with a threshold below which products are tax-free. Again, this allows manufacturers to reformulate the products and encourages

consumers to opt for healthier products. Ideally, such a progressive scheme is linked to nutrient labelling, raising consumers' awareness.

f) HFSS taxes should be implemented in the form of **specific excise taxes** (not ad valorem taxes).

g) HFSS taxes should **focus on SSBs** first of all, as these are easier to implement than other HFSS taxes and less vulnerable to definitional issues and potential legal challenges. HFSS taxes need to be designed in a way that is consistent with the defined health objective(s) and avoids discrimination between products which are comparable in view of such objectives.

h) The scope of SSB taxes should be drinks with **free and added sugar**, while the tax rate should be defined based on the amount of **total sugar**. As not all Member States tax artificial sweeteners as well as free sugars contained in milk-based products and fruit juices, the case for taxing such products is considered weaker.

i) **Exemptions for small independent producers** up to a certain threshold should be considered, because the compliance costs and tax burden are likely to be disproportionate for the smallest producers. At the same time, exemptions for products from the smallest producers will only have a minimal impact on the overall health outcome and revenues. Preferably, there should be alignment on an upper bound for such a small business exemption across the EU.

The following steps can improve the acceptability, feasibility, effectiveness and efficiency of HFSS taxes in general and SSB taxes in particular:

j) **HFSS tax schemes should be developed jointly by tax and health ministries** and communicated as a health instrument; HFSS taxes should be evidence-based and regularly evaluated against measurable (intermediate) goals.

k) HFSS taxes should be **part of a broader range of measures** including efforts to restrict the marketing, advertising and promotion of such products and to increase consumer awareness, through food labelling and education.

Excise taxes on HFSS products should be prioritised over initiatives related to reducing VAT on healthy food products. Although such VAT measures can help to incentivise positive changes in consumption behaviour, VAT reductions are less targeted and efficient than HFSS taxes. For instance, incomplete pass-through for reduced VAT rates benefits producers and retailers at the expense of the public budget. At the same time, the exclusion of SSBs from reduced VAT rates applied to food in some Member States would be consistent with HFSS taxation.

5.2. What would be the benefits of an EU approach?

While national HFSS taxes produce some desirable effects such as product reformulation by producers and substitution effects in consumption and, thus, help

to achieve the declared national policy objectives, the **heterogeneity of HFSS taxes in Europe could result in undesirable effects on the Single Market**. Undesirable effects and problems of divergent and unilateral HFSS taxes, respectively, could emerge should more Member States decide to introduce HFSS taxes. Such effects could constitute obstacles to the functioning of the internal market resulting from cross-border shopping or market fragmentation arising from differing reporting obligations for companies linked to different monitoring activities undertaken in individual EU Member States.

While the magnitude of these obstacles cannot be fully assessed, it would be expected that these increase as Member States introduce new HFSS taxes or amend existing schemes. EU minimum harmonisation is a possible solution to tackling such obstacles, or at least could contribute to solving certain issues. Its ability to do so depends on the level and scope of EU harmonisation that would be foreseen. For instance, minimum harmonisation may include the definition of the minimum tax rate at the EU level, while Member States can adopt a higher tax rate. For the purposes of this study, three scenarios of HFSS tax harmonisation are developed.

A **simulation of three possible HFSS tax harmonisation scenarios** has highlighted some of the most important transmission channels of an EU-wide harmonisation of SSB taxes.

The average daily sugar intake is reduced by 1.6 percent (scenario 1), 5.8 (scenario 2) and 7.2 percent (scenario 3), respectively. The strongest effects are observed in Slovakia and Czechia, but there is also a relevant reduction in sugar intake in countries such as Bulgaria, Germany, Malta and Slovenia.

This translates into positive health effects of an EU harmonised SSB tax, such as a reduction in BMI. Averaged across the EU, the decrease in BMI among the adult population ranges from 0.01 in Scenario 1 and 0.04 in Scenario 2, to 0.05 in Scenario 3. This, in turn, leads to a reduction in the incidence of diseases for which a high BMI is an established risk factor: Scenario 1 leads to a reduction of 0.05 percent in the incidence of IHD and 0.1 percent in the incidence of diabetes. Scenario 2 leads to a reduction of 0.2 percent in the incidence of IHD and 0.5 percent in the incidence of diabetes. Scenario 3 leads to a reduction of 0.3 percent in the incidence of IHD and 0.7 percent in the incidence of diabetes. There is considerable variation across countries, which is caused by the variation in effects on consumption and differences in the current distribution of BMI within the populations. Beneficial health effects would be stronger for the lower income households in most Member States.

The price effect of a minimum specific excise tax would be most profound in countries with low baseline prices for SSBs. Based on the HBS data available, this will imply a price increase for regular sugar carbonates in Slovakia, Romania and Greece.

Although a minimum harmonisation of SBB taxes at the EU level would primarily support health policy objectives, its impacts could be felt across a range of policies beyond. The objective to improve public health in the EU is completely **coherent with the objectives of other measures.** The objectives related to addressing potential market distortions through EU-level HFSS tax harmonisation and to streamlining national frameworks and reducing administrative burdens are fully in line with the overall EU objective of the creation of the internal market (Article 3

(3) TEU). Our analysis confirms that there would be **no duplication or overlap with any of the existing measures** as there are no equivalents in place. Minimum harmonisation of SSB taxes would also be **complementary to and support media, sports and education measures** that already address the problem of NCDs and specifically diseases related to the excessive consumption of SSBs. In addition to these objectives, an EU harmonised HFSS tax would pursue a fiscal objective, namely increasing tax revenue, which does not contradict or undermine public health objectives.

The simulations show that additional tax revenues for an EU harmonised SSB tax would (Scenario 1) amount to roughly 90 million Euro, with the largest fraction arising in Germany. The additional tax revenues under Scenarios 2 and 3 are more substantial with an additional 670 million Euro and 900 million Euro respectively - reflecting that the assumed minimum taxes in these scenarios are considerably higher.

Other possible routes such as the taxation of sugar at the level of import or production are not considered in this report, as it is based on existing evidence and practices with HFSS taxes at national level.

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