Taxing Ultra-Processed Foods or Foods High in Fat, Sodium, or Sugar

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ABSTRACT

Health taxes on alcohol and tobacco have been ongoing across the globe for several decades, with the past decade also seeing an increase in the implementation of sugar-sweetened beverage taxes. In recent years there has also been increasing attention focused on a segment of foods referred to as ultra-processed foods (UPFs), most frequently identified by their key nutrient markers of being high in saturated fats, sugar and sodium (HFSS). The factsheet "Ultra-Processed Foods: A Global Threat to Public Health" provides an evidence-based overview of why UPFs specifically should be the targets for tax policies (among other policies) given their harm to humans and the planet. Trends in population and income growth, urbanization, and changing workforce structures mean that low- and middle-income countries (LMICs) are emerging and important markets for UPF companies. Thus, meaningful excise taxes on UPF or HFSS products are policy levers that may be used to shift relative prices and demand, as well as encourage industry reformulation. Over time, such taxes may result in beneficial, progressive health impacts while raising revenue but are often argued by opponents as being income regressive. There are 23 countries (21 active) that have implemented excise taxes on UPF/HFSS food categories to date. However, there are only 3 countries with robust peer-review evaluations conducted, so there are gaps in our understanding of the various short- and long-term impacts of UPF/HFSS excise taxes on tax pass-through, demand, and health outcomes. While there are a growing number of simulation studies, even demand models or reduced form models on health outcomes are limited because UPFs are not well- or uniformly defined. Nonetheless, the limited evidence on excise taxes on UPF/HFSS categories to date shows that they can reduce UPF/HFSS purchases and consumption – but tax type, tax levels and the included tax base could be improved. Additionally, this background paper pulls together available information on revenues generated to show that UPF/HFSS food tax revenues implemented in Hungary and Mexico range from 0.4 to 0.12% of GDP, while hypothetical UPF/HFSS food taxes resulting in 8-10% price increases among taxed products in the United States and Chile may generate revenues ranging from 0.024% to 0.096% of GDP. These tax revenues could be used to improve access to and reduce the costs of healthier food which would complement the health impacts of a tax and enhance population health equity.

"[Ultra-processed foods are] formulated mostly or entirely from substances derived from foods. Typically contain little or no whole foods. Durable, convenient, accessible, highly, or ultra-palatable, often habit-forming. Typically, not recognizable as versions of foods, although may imitate the appearance, shape and sensory qualities of foods."[1]

1. Introduction

Over the past six to seven decades, food production, manufacturing, packaging, marketing and retailing has become increasingly industrialized and conglomerated. This has led to a rapid growth in consumption of ultra-processed foods and drinks (herein, UPFs). UPFs now account for over half of estimated total calories consumed in many high-income countries and around 20-40% of calories in middle-income countries, with younger generations consuming higher levels of UPFs.[2] Importantly, UPFs displace unprocessed or minimally processed foods, freshly prepared meals, and traditional cooking in the diet in most countries, causing significant nutritional, social, cultural, economic, and environmental disruptions.[3-18] Additionally, demographic shifts show that low-income countries already are and increasingly will be home to the largest share of the world's population, and are important markets for the UPF industry.[19] It is therefore expected that without any meaningful policy action, the share of UPFs in the diets of people residing in low-income countries will quickly rise.

These trends are of major concern. The accompanying 2023 factsheet from the Global Food Research Program, "Ultra-Processed Foods: A Global Threat to Public Health," lays out the alarmingly destructive impact of higher UPF diets on human and planetary health.[20] Indeed, a 2023 Lancet commission reports that the commercial alcohol, tobacco, and ultra-processed foods sectors account for a third of deaths globally,[21] with products and practices from the commercial UPF sector being linked with 3.52% of all deaths in Europe in 2021.[22] More recently, an umbrella review of the evidence from 45 meta-analyses encompassing almost 10 million participants found direct associations between exposure to UPFs and 32 health parameters including mortality, cancer, and poor mental, respiratory, cardiovascular, gastrointestinal, and metabolic health.[23] The strongest evidence was for all-cause mortality, obesity, and type 2 diabetes (equivalent odds ratios of 1.02, 1.07 and 1.12, respectively).[24] These non-communicable chronic diseases (NCDs) inflict enormous human suffering, prevent people and countries from meeting their potential, and impose exorbitant short-term and long-term economic costs, which are borne by society at large. Meanwhile, a shrinking number of corporations who increasingly own and control much of the modern and global food supply chains are seeing record revenues and profits.[25-28]

This paper discusses one of several policy options to tackle the health and revenue impacts of UPFs: excise taxation of UPFs to raise the relative prices of UPFs (compared to minimally processed alternatives). This can discourage UPF consumption, correct externalities imposed on society, and raise government revenue so that there can be direct and indirect promotion of health and enhancement of equity.

2. Health and economic rationale for taxing UPFs or HFSS products

The link between higher UPF intake and poor health outcomes is strong and growing, although the mechanisms through which UPFs lead to these poor health outcomes remain under investigation and debate. Their association with negative health outcomes is partly explained by the fact that UPFs tend to be high in specific nutrients of public health concern (i.e., added sugars, saturated and trans fats, and sodium) and energy density. Indeed, these attributes have been generally considered as a key (but not definitive) markers of UPF items.[29,30]

However, several studies have demonstrated that the associations between higher UPF consumption and poor health outcomes are not entirely explained by nutrient content alone, but also by processing level.[31-34] Additives commonly present in UPFs can cause alterations in the microbiota that lead to inflammatory responses.[35-39] High levels of processing can alter the structural matrix of foods,[40,41] resulting in UPFs being poorly satiating and hyperglycemic.[42-48] Additionally, researchers are investigating how the hyperpalatable and addictive nature of UPFs may shape its health impacts.[49,50] These mechanisms provide stronger rationale for public health efforts that discourage UPF products based on more than just their nutrient content.

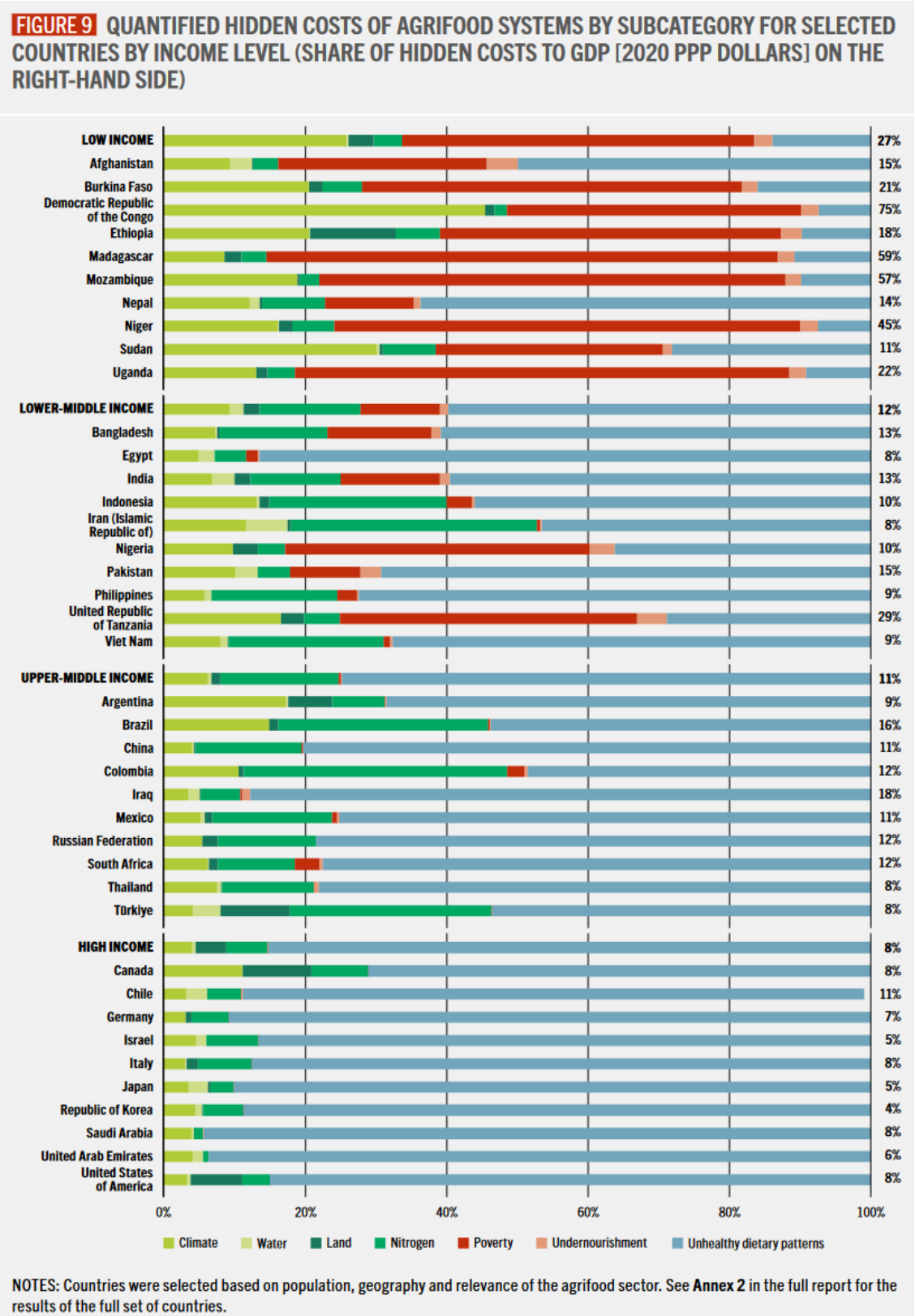
Policy-wise however, there has yet to be clear and implementable criteria to assign individual products as UPFs. There have been proposals to classify UPFs based on the presence of various classes of additives.[51] But given the existing state of the science and regulatory definitions available, most policies meant to discourage UPFs have primarily been operationalized by targeting items high in saturated fats, sugars, sodium (HFSS), and sometimes energy, based on pre-established threshold values.

Additionally, despite the link to so many different poor health outcomes, there has yet been a thorough analysis of the overall attributable health-related and environmental-related costs of diets high in UPFs across and within countries. What is known is that globally, the hidden costs of our modern-day food system stack up to $12.75 trillion, with unhealthy dietary patterns accountable for $9.31 trillion of this figure.[52] In high-income countries, where dietary consumption is dominated by UPF, the share of hidden costs attributed to unhealthy dietary patterns is much higher (see Figure 1).[52]

This does not mean that taxes on UPF or HFSS products should be limited to high-income countries. With increasing populations, income growth, urbanization and changing workforce structures, low- and middle-income countries (LMICs) are newer and emerging markets for UPF companies (see Figure 2).[53] Given current rising trends in UPF consumption in LMICs (see Figure 3),[54] it is critical to begin implementing policies that can mitigate this growth and prevent associated poor health outcomes and economic, human, environmental and social costs.

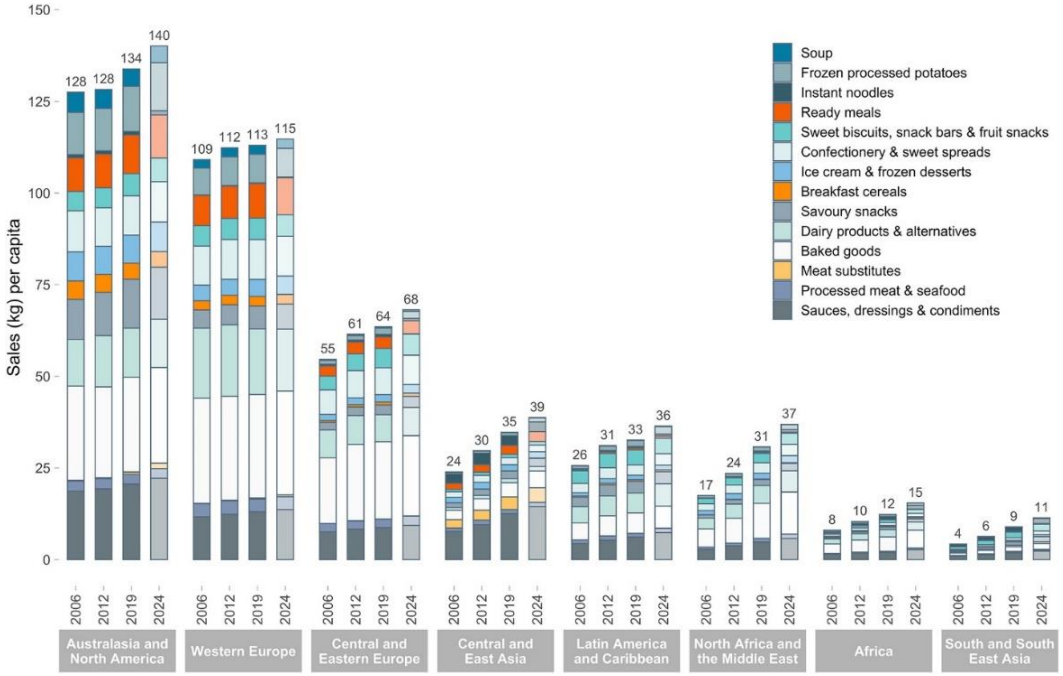
Assuming taxes are sufficiently passed through to consumers, the primary purpose of taxing UPF or HFSS products is to raise prices of these products relative to alternatives. As with other health taxes, this discourages consumers from purchasing targeted products and instead nudges them to choose more of the healthier alternatives. Taxes may also be designed to incentivize food and beverage manufacturers to reformulate their products, which can reduce the nutrient-related harms of UPF or HFSS products. Additionally, taxes are one way to address market failures associated with food choices, particularly if they are paired with complementary policies that address current information asymmetries, like consumers' limited awareness or access to information about the future health risks associated with certain foods, nutrients, ingredients, or additives.

Figure 1: Unhealthy dietary patterns drive hidden costs of global food system in higher-income countries



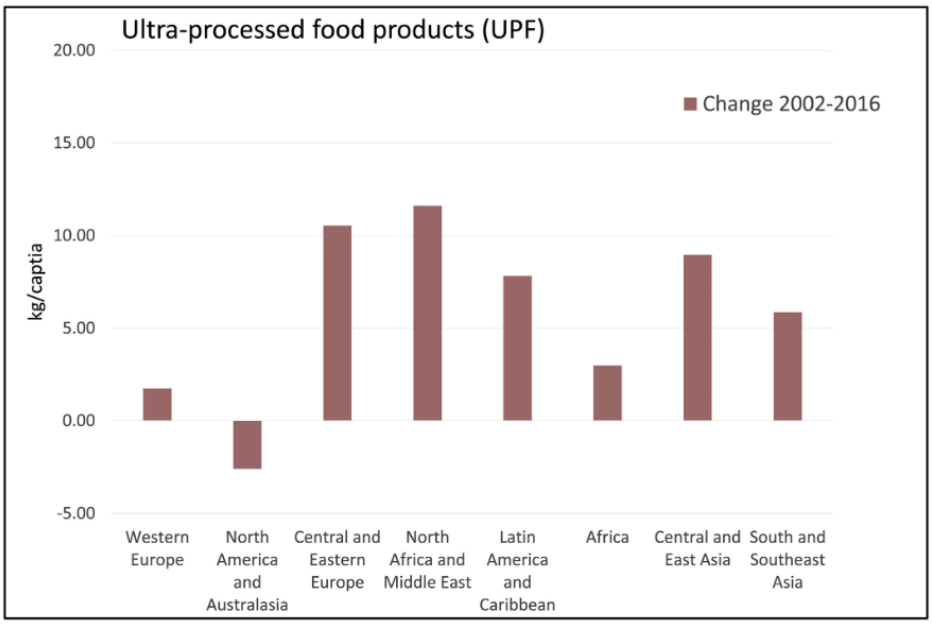
Source: FAO. 2023. *In Brief: The State of Food and Agriculture 2023. Revealing the true cost of food to transform agrifood systems*. Rome. https://doi.org/10.4060/cc7937en

Figure 2: UPF sales volume per capita across the globe (2006-2024)



Source: Baker P, Machado P, Santos T, et al. Ultra-processed foods and the nutrition transition: Global, regional and national trends, food systems transformations and political economy drivers. *Obesity Reviews*. 2020;21(12):e13126. https://doi.org/10.1111/obr.13126

Figure 3: Change in total UPF sales volume per capita (2002-2016)



Source: Vandevijvere S, Jaacks LM, Monteiro CA, et al. Global trends in ultraprocessed food and drink product sales and their association with adult body mass index trajectories. *Obesity Reviews*. 2019; 20(S2): 10–19. https://doi.org/10.1111/obr.12860

3. Excise taxes to reduce UPF or HFSS product consumption and consequences

Taxes have an important role to play in shifting relative prices and affordability. Currently, most healthy foods are substantially more expensive than unhealthy options in most poorer countries.[55] For example, a study using Brazilian dietary guidelines found that the prices of UPFs have fallen considerably since 1995 to become cheaper than more health-supporting foods, and predicts that unhealthy foods will become cheaper than healthy foods in 2026.[56] Indeed, it has been shown that over 3 billion people globally (42% of the world's population) could not afford a healthy diet in 2021.[57] Therefore, fiscal policies that can reduce the relative affordability of UPF or HFSS products and/or improve the affordability and accessibility of minimally processed foods are recommended.

Estimating changes in consumption

To assess the potential of fiscal policies to improve diets and related health outcomes, there is a need to understand the own- and cross-price elasticities of demand for both foods to discourage and foods to encourage. To this end, demand systems models have been conducted in many countries and in some cases expanded to test fiscal policy options and designs of taxes on select unhealthy food categories.

For example, a study of Colombia's national income and expenditure survey found that the average own-price elasticity of demand was -1.01 for snacks and condiments and -0.8 for sweets and candies, with lower socio-economic status (SES) households having more elastic demand at -1.16 and -0.89 respectively compared to mid-high SES households.[58] This means that if the price of snacks and condiments increased by 10%, lower SES households would reduce their purchases of these items by 11.6%; if the price of sweets and candies increased by 10%, purchase would decrease by 8.9% (if multiple price increases occurred concurrently, the shifts would be somewhat different due to complementary and substitutions across food categories, but this previous work did not simulate potential combination of taxation policies to properly elucidate the net implications).

Similarly, a demand-systems study in Chile found that unhealthy foods are price-elastic, although it did not find consistent differences by SES.[59] Moreover, a simulation of three policy options – an 18% tax on food and beverage categories likely to be high in saturated fats, sodium and/or sugars; a 40% tax only on sugar-sweetened beverages (SSBs); and a 1 Chilean peso per gram of sugar tax – found the 18% tax to be linked with the highest reduction in caloric intake and sodium and saturated fats, as well as significant reductions in added sugars.

Another study in India estimated the potential demand (and revenue, see section VI) impact of adding additional 10–30% taxes to the existing tax rates on the consumer prices of sugars and HFSS.[60] The study found that for manufacturers of sweets and confectionaries who buy sugar in bulk and assuming a price elasticity of −0.70, 20% additional tax (total tax 48%) would result in 13–18% decrease in the demand for sugar used for confectionaries and sweets. For HFSS food products, a 10–30% tax would result in a 5–24% decline in the demand for HFSS products.

Significant limitations of virtually all models for estimating demand elasticities and then using these to simulate fiscal policy options are that the food categories used are often not disaggregated enough to properly distinguish UPFs or whether products are HFSS. Rather, they are based on broad food categories where it is likely that a large proportion of items could be considered UPF and/or HFSS. Consequently, there are significant assumptions and lack of precision in understanding the potential nutritional implications of UPF or HFSS tax policies. Moreover, the global evidence on price-elasticity for unhealthy foods is less conclusive and can vary considerably, mainly because there is a lack of consensus regarding the definition of UPF/'junk' food and variations in food groupings used.[59,61]

Two papers on Chile and the United States using detailed household purchase data at the barcode level with nutrient label data layered on provided rare examples of being able to better estimate changes in demand across policy-relevant groupings using nutrient-based or HFSS definitions.[62,63] These studies found that identifying UPF categories and then using HFSS definitions to identify what products within those categories are subject to taxes would result in reductions in the quantity purchased of the targeted items, reductions in the targeted nutrients to discourage, and generate significant tax revenues (see section VI).

Nonetheless, even with these more precise data, model simulations will be unable to account for or predict the degree of potential reformulations that might occur as companies reduce the amount of sugars, sodium, or saturated fats in their products to avoid labeling or tax policies. Real world evidence from mandatory front-of-package (FOP) labeling regulations and taxes based on sugar content suggests that regulations defined by HFSS results in reformulations, such that reductions in intakes of the targeted nutrients would likely fall more than estimated.[64-66] This might be beneficial for health, but also means that a lower share of products would be subject to regulation, such that a tax regime defined in part by HFSS will also result in lower tax revenue generated than estimated. Moreover, some argue that using HFSS definitions alone would ignore how other markers of UPFs (e.g., the presence and amounts of various Codex classes of additives or other ingredients) may impact health directly/independently or via their synergistic interactions with other UPF markers. These potential mechanisms still need to be studied, but is could be the case that tax (and other policy) designs that are only HFSS defined may thus be insufficient to address health-related goals.[51,67]

Estimated Health Impacts

In countries where excise taxes on HFSS foods have been implemented, it is possible to use observed findings on changes in purchases or dietary intakes as parameters for simulating health-related outcomes. Studies doing this in Mexico estimate that the 8% ad valorem excise tax on non-essential high energy dense foods should lead to a reduction in the mean body weight and BMI of 0.40 kg and 0.19 kg/m2 respectively, one year post- tax implementation, which translates into −1.7% points reduction in overweight and −0.4% points in obesity prevalence.[68] Additionally, the implementation of Mexico's food tax and SSB tax together was found to be associated with reductions in outpatient visits for dental treatment, as well as reductions in poor oral outcomes (decayed, missing and filled teeth, as well as dental caries and teeth with caries experiences).[69]

In countries without such taxes implemented yet, there is a need to either estimate the association between UPF prices and health outcomes directly or estimate potential consumption changes and then rely on microsimulation population studies estimating the potential health-related impacts of UPF taxes on BMI, the prevalence of overweight and obesity or other health outcomes. Using the former approach, a study using 2009-2014 data on military veterans in the United States found that raising the price of UPFs by US$1 was associated with 0.08 lower BMI units for men and 0.14 lower BMI units for women.[70] Moreover, higher UPF prices were associated with lower BMI among both low-SES men and low-SES women, with no statistically significant associations found for middle- or high-SES men or women. Similarly, in Brazil, it was found that a 1% increase in the price of UPFs would lower the prevalence of overweight by 0.33 percentage points (95% CI: 0.20%–0.46%) and lower the prevalence of obesity by 0.59 percentage points (95% CI: 0.36%–0.83%) of obesity.[56,71]

Using the latter approach, a demand system model informed fiscal policy simulation study conducted in Finland found that the demand for sugar and sweets is price elastic.[72] Modelling suggests a sugar tax of 1 €/kg would produce a sizable effect on the incidence of obesity and overweight, a 13% reduction in the incidence of type 2 diabetes, and a smaller reduction in the incidence of coronary heart disease. These health effects were estimated to be more pronounced for low-income individuals. Meanwhile, lowering existing value added tax (VAT) rates for fresh fish, fruit, and vegetables was found

to have a small positive health effect by reducing the incidence of coronary heart disease and cardiovascular mortality.

Another modeling study conducted in New Zealand compared the estimated purchase, BMI, health outcome, and health expenditure effects of a 20% fruit and vegetable subsidy, of saturated fat, sugar and salt/sodium taxes (each set at a level that increased the total food price by the same magnitude of decrease from the fruit and vegetable subsidy), and of an 8% tax on non-essential, energy-dense food.[73] It found that a tax on sugar (across all foods, not just sugary drinks) produced the greatest health gain, increasing health-adjusted life-years (HALYs) over the remaining lifespan of the population by 1.91% compared with business as usual, or 581 HALYs per 1000 people.[73] The saturated fat and salt/sodium taxes each achieved about two-thirds of this gain, and the fruit and vegetable subsidy nearly 40%. An 8% junk food tax achieved the least gain at 127 HALYs per 1000 people, commensurate with a smaller price increase compared to the earlier tax policies.[73] Estimated health expenditure savings were large, ranging from US$492 to $2164 per citizen over the remainder of their lives, even when discounted at 3% per annum.[73]

Finally, a study using data from 101 countries found that an increase in the tariff difference between highly processed and less processed foods can be an effective measure to reduce obesity prevalence.[74] They note that such policies may be particularly effective for low-income groups and for women but could push the poorest consumers further towards underweight if the food supply does not provide attainable alternatives. This highlights the need to consider complementary policies, especially in low-income settings, to support financial access to minimally processed foods.

4. Considerations for UPF or HFSS excise tax designs

While taxes on UPF or HFSS products are not as common as taxes on SSBs to date, there are already many lessons from sugary beverage taxes that can be transferable for designing UPF or HFSS taxes. These design decisions on tax type, tax base, tax level and administration are inter-related and should be considered concurrently with each other with the larger health-oriented goal in mind. In addition, UPF or HFSS taxes can and should be integrated with other complementary and mutually reinforcing policies such as FOP labeling, food assistance to low-income people to make healthy alternatives accessible, or funding healthy school feeding programs.

There is now strong evidence that excise taxes levied on and collected directly from manufacturers or distributors are easier to administer and collect, as the process involves fewer entities for the tax authority to oversee.[75] It will be important for tax authorities to assess the market structure and market share of food and drink manufacturers and distributors in their country to assess the likely pass-through of the tax onto prices, and the administrative burden and how to prioritize tax collection.

Excise tax type

Evidence shows that specific taxes are more likely than ad valorem (percentage of a "base price") taxes to be passed through to consumer prices. This may be because under ad valorem taxes, the "base price" chosen may be too early in the supply-chain and does not account for the various mark-ups along the supply-chain. Consequently, even a seemingly high ad valorem tax rate might only result in a small price change seen by the consumer. Moreover, ad valorem taxes would not account for volume/weight, and so larger package formats that will be cheaper per unit will have a lower tax value compared to equivalent specific taxes based on volume. This may encourage manufacturers to promote larger package sizes and dampen the tax's intention to discourage the consumption of UPF or HFSS items.

Specific taxes may provide additional options for setting the tax level based on volume/weight, nutrient-density, and/or presence of ingredients. Increasingly, sugary beverage taxes are being designed based on sugar-density, with higher tax amounts when there is more sugar per 100ml of the beverage, such as in the United Kingdom and South Africa.[76] For UPF or HFSS products, it is likewise possible to apply specific taxes based on nutrient density (e.g., calories per 100g, sugar per 100g) either by setting thresholds or taxing each additional gram of sugar/100g, for example. In countries that have implemented FOP nutrient warning labels such as in Mexico, Chile, and Argentina, it would also be possible to design the specific tax by volume based on the number of warning labels. From a health standpoint, it is critical that products with greater amounts of nutrients linked to poor health outcomes are taxed higher to effectively discourage consumption. Furthermore, food manufacturers could reduce their tax liability by reformulating their products to contain less sugars, sodium, saturated fats, and calories. A survey of food manufacturers in Hungary found that 40% of manufacturers changed their recipes to reduce nutrients of concern in their products after the implementation of Hungary's specific tax by volume using nutrient thresholds for HFSS categories.[77,78] Therefore, UPF or HFSS taxes based on nutrient-density and/or presence of ingredients can encourage both producers and consumers to shift their behaviors.

However, specific taxes can be more challenging to administer as it would require more information about the product. Additionally, specific taxes need to be adjusted at least annually to account for inflation, otherwise the value of the tax will diminish over time; it is thus important to ensure that any specific tax design include explicit terms around regular inflation adjustments. Additionally, because specific taxes do not account for base price, cheaper items will have higher effective tax rates and more expensive items will have lower effective tax rates, making the tax policy more income regressive since those with lower incomes tend to buy cheaper versions of products.

In theory, it is also possible to implement excise taxes on UPF or HFSS products that incorporate both ad valorem and specific elements, such as by setting an ad valorem rate at the food category level, alongside a specific tax amount based on nutrient density or the number of nutrient warning labels. This could ensure that food categories considered to be largely comprised of UPFs would be taxed at a minimum ad valorem rate, with items containing higher densities of nutrients to discourage having additional specific taxes based on nutrient density. However, such tax designs have yet to be implemented.

Excise tax base

In general, the broader the tax base (more types of products covered) the fewer options for substitution there will be. Evaluations of past/current HFSS excise taxes show that while the purchase and intakes of taxed products fell, there can be measurable shifts to other unhealthy untaxed food items within packaged items and via unpackaged sources (as the tax policies to date have been primarily limited to the pre-packaged sector). It is also possible to take a stepwise approach by first having a smaller tax base with a plan to meaningfully expand the tax base over time.

Among pre-packaged food items, assuming data is available, one operational definition would be to include products with ingredients such as added sugar, added sodium, added fats, non-sugar sweetener, flavoring, colorant, or any of the other Codex functional classes (e.g., bulking agent, gelling agent, etc.) under the tax policy. In the US, such an approach has been shown to capture the majority of UPF products.[51] The tax level among these products (both imported and domestically produced) could then be set based on nutrient-densities, the number of the above ingredients present, or combinations of the above.

Among non-packaged items such as those provided through food service, it may be more challenging to apply definitions based on ingredients and nutrient-densities at the item level. However, it could be possible to apply taxes on the sales of sugars, sodium, fats or any of the other ingredients to food service businesses, as proposed in the UK National Food Strategy in the case of sugar and sodium (using a specific tax)[79] and as simulated in some tax policy designs.[73] Along the same lines, a systematic review suggests that taxing all foods based on their sodium content rather than taxing only foods high in sodium is likely to have more impact because sodium is pervasive in the food chain.[80] However, all real-word examples of sodium taxation to date have focused on taxing specific products with very limited examples of taxing products that exceed a certain threshold of sodium density. As such, there is no empirical evidence on the implementability or effectiveness of taxing all foods based on the content of sodium (or any other nutrient to discourage).

Excise tax level

Previous work demonstrates that the likely optimal tax level for sugary beverages in the US taking into account externalities and internalities associated with sugary drink consumption would require raising retail prices by 40%.[81] To determine something similar for UPF or HFSS products is more challenging, particularly given the more complex nature of foods compared to beverages and the variability of own and cross price elasticities of demand across many more food categories. It is certainly the case that modest price increases will have small effects on consumption and health, while larger increases will have larger impacts; likewise, the broader the tax base, the fewer the substitutions and so will the larger the health implications. One important element of setting high tax levels from the beginning is the signal it sends to both producers and consumers – that the taxable products are harmful to health and their availability and consumption need to be reduced.

The determination of the tax level also largely depends on the tax type and base as discussed above. Specific taxes based on nutrients (e.g., $0.02 per gram of sugar) would not use the ex-factory or shelf-price of products to assess the tax liability and instead tax every gram of a targeted nutrient similarly, regardless of whether a product is a pricier or cheaper brand to begin with. Thus, under such tax design, the determination of the tax level should be a function of the nutrient reduction goals.

Meanwhile, responses to ad valorem taxes using a base-price to assess tax liability will largely depend on own and cross price elasticities across the various food categories and food category reduction goals.

Excise tax administration

As with other health taxes, effective tax administration of UPF or HFSS products requires good systems and control over the food supply and distribution chain, including licensing of all entities involved in the manufacture, import, and distribution of taxed items, and monitoring of products as they move though the supply chain.

To identify what products are subject to the tax, there are several options that countries can consider. One of the most common ways is to use the World Customs Organization harmonization system (HS) codes as a starting point. Countries can use the existing structure as the basis on which to create new subcodes (such as based on nutrient content). Another approach in countries that have complementary policies, such as FOP warnings, is to directly link the tax design to these other policies, with the labels providing an easy way to track tax liability. Some countries already utilize QR codes or barcode stickers to track the authenticity, or tax stamp identifiers for products such as tobacco and alcohol, which could be extended for use for UPF or HFSS items. When possible, it would be useful to integrate existing regulations or tax collection systems with UPF or HFSS product excise tax administration and collection.

The technical capacity of the tax revenue agency is also critical to ensure that tax administrators can monitor tax compliance and understand the market structure and landscape to mitigate tax avoidance and evasion. Timely tax payments, record-keeping systems and periodic random audits, along with significant penalties on those who do not maintain records following set protocols and/or attempt to evade taxes, are also important enforcement mechanisms that need to be established and upheld.

Excise tax revenue use

The use of the revenue generated from taxing UPF or HFSS products is an important way to enhance their health impact. An option to counter the growing prevalence of UPFs and conglomerate control of the food system is to direct tax revenue towards promoting the supply and/or demand of regionally produced, minimally processed foods that support health. The food shortages and inflation brought on by the Covid-19 pandemic, recent wars, and extreme weather events have exposed the fragility of the global food supply chain, and thus the need to enhance resiliency in regional food systems and non-conglomerates when possible. The tax revenue can be used to provide credit to smallholder farms, grants for acquiring or improving inputs, and climate-smart technologies. Requiring some degree of public procurement from regional sources can also support this effort. This has been implemented in Brazil through their national school feeding program, Programa Nacional de Alimentação Escolar (PNAE).[82] Such revenue uses also create multiplier effects for the regional economy as the gains remain within the country rather than becoming profits for multi-or transnational corporations.

Despite the fact that such taxes are progressive for health, it is critical to address concerns raised by opponents around the potential for such taxes to be income-regressive because lower income consumers spend a larger share of their income on food. Lower income consumers tend to benefit more from health taxes because they are often more exposed to the health risks associated with UPF or HFSS products, and because they tend to be more price-responsive.[63,83-86] Nonetheless, there is a need to further support low-income consumers to access healthier alternatives given their budget constraints. As such, studies have investigated the distributional implications of combining HFSS taxes with subsidies on healthier items, such as fruit and vegetables, whole grain alternatives, lean proteins, and healthier beverages. Overall, both experimental and simulation-based studies show that fiscal policy packages that combine taxes with subsidies can result in larger nutritional and dietary intake improvements and offset the financial implications of the taxes among lower-income consumers.[63,87,88]

5. Current status of UPF or HFSS excise taxes

Globally, excise taxes that target UPF categories are less common than other health taxes. However, concerns around UPF are growing. Traction is developing in Latin America, including as part of an integrated set of policy designs seeking to discourage UPF consumption and availability. Insights can be gleaned from considering the evidence from countries that have taxed food categories with products that are predominantly considered UPF or high in (saturated) fats, sugar, sodium (HFSS).[89]

Using the WHO Global database on the Implementation of Food and Nutrition Action (GIFNA),[90] alongside existing published literature, to date, there are currently 21 countries that have national-level excise taxes in place on food categories that are predominately HFSS. Ten are island nations (Dominica, French Polynesia, Fiji, Kiribati, New Caledonia, Samoa, Tonga, Tuvalu, Vanuatu, and Mauritius), three are in Southeast or South Asia (Brunei, India, and Nepal), three are in Latin America (Colombia, Mexico, and Paraguay), three are in Africa (Ethiopia, Uganda, and Tunisia) and two are in Europe (Hungary and Norway). In addition, two other countries in Europe implemented and then repealed taxes on select HFSS products. Finland previously taxed sugar confectionaries, chocolates and ice-cream products for 3 years (2011-2013) before repealing the tax in January 2014. Denmark previously had a tax on products high in saturated fat (implemented in October 2011) but was repealed 15 months later largely due to strong industry and political opposition given the revenue-driven (rather than health promotion) objective of the tax and concerns around the tax design.[91] The tax design of each of these 23 cases are shown below in Table 1.

In December 2022, Colombia became the first country to pass legislation that was explicitly meant to target UPFs via excise taxes. This came into effect on 1 November 2023, with tax rates increasing over a three-year period. While the term “UPF” was used, the operationalization to determine the tax rates was by food categories and based on whether they exceed nutrient thresholds – consistent with their FOP warning labeling system that started to be implemented in June 2023. In other words, despite the UPF framing, in practice the determination of whether a product is subject to the tax depended on the food category it was in and being HFSS, and not based on any other UPF marker including degree of processing, presence of colorants or other additives. There is at least one research team that is evaluating the combined fiscal and front-of-package warning label policies; results are not expected until 2026.

There have yet to be peer-reviewed evaluations conducted on the excise taxes implemented in island nations, Southeast or South Asia, Paraguay and Africa (largely due to paucity of data) and assessments of the taxes in Finland and Norway had very limited measures. Consequently, real-world evidence on how such excise taxes might shift consumption and impact health is limited. A comprehensive systematic review of the effectiveness of health taxes on HFSS from real-world studies on HFSS food taxes implemented in the three countries (Mexico, Denmark, Hungary) and select jurisdictions in the US as of March 2023 found evidence that such taxes decreased sales, or purchases, and intakes of taxed HFSS foods, especially when taxes were combined with subsidies on healthy foods.[92] The review also found six experimental studies predicting the effects of potential health taxes on HFSS in four countries (the Netherlands, Canada, New Zealand, and Singapore), finding that combining taxes and subsidies contributed to improve equity. Across both real-world and experimental studies, most studies found higher tax rates were more effective in reducing purchases or consumption, and tax effects differed by income level, with the lowest-income groups being most responsive.

Table 1: Excise Taxes on HFSS or UPF categories or items (as of May 2024)

Country	Tax type & implementation date *(end-date, if any)*	Food categories subject to or exempt from excise tax	Excise tax rate	Nutrient thresholds *(if any)*
Dominica [93]	Ad valorem excise tax on ex-factory price since 1 Sept 2015	• Sugar confectionaries, including chewing gum • Cocoa products	10%	N/A
French Polynesia [94]	Tiered volumetric excise tax since 2001	• Sugars (cane, beet, lactose, fructose, molasses, etc) • Sugar confectionaries • Cocoa products • Cereal products • Biscuits • Ice cream • Canned milks, milk or cream with added sugar • Jams, marmalade, jellies • Flavored syrups	Tax rate depends on sugar/100g or ml product: • <5 g sugar = 0 FCFP/kg or L • 5-9.99 g = 40 FCFP/kg or L • 10-29.99 g = 60 FCFP/kg or L • 30-39.99 g = 90 FCFP/kg or L • 40 g or more = 120 FCFP/kg or L	
Fiji	Volumetric excise tax since 1 January 2024	• Snack foods • Sugar confectionaries • Sweet biscuits • Ice cream Exempt: traditional Indian sweets	40 cents/kg or L	N/A
Kiribati	Ad valorem excise tax on ex-factory price since 1 April 2014	• Sugar (cane, beet, lactose, maple, glucose, fructose, molasses) • Sugar confectionaries, including chewing gum • Cocoa products	20-55%	N/A
New Caledonia [95,96]	Ad valorem excise tax since 2018	• Sugars (cane, beet, lactose, fructose, molasses, etc) • Sugar confectionaries • Cocoa products • Cereal products • Biscuits • Ice cream • Canned milks, milk or cream with added sugar • Flavored syrups • Sauces and condiments	22% for all categories (and 140-150 FCFP/kg of refined grain or cereals)	N/A
Samoa	Ad valorem excise tax on ex-factory price since 1 July 2016	• Sugars (beet, cane, lactose, maple syrup, fructose, molasses, etc) • Salt • Sweetened confectionery, gum, cocoa products • Sweet biscuits and cakes • Bread products • Savory snacks • Instant noodles • Pizza	5% for salt and beet or cane sugar; 8% all else	N/A
Tonga	Volumetric excise tax since July 2014 (June 2018)	• Turkey • Ice cream • Mutton flaps • Chicken leg quarters • Instant noodles	• $1.50 TOP/kg • $1.50 TOP/L • $1.15 TOP/kg • 40 seniti/kg • $2 TOP/kg	N/A
Tuvalu	Volumetric excise tax since Jan 2021	• Ice-cream • Processed meats and parts • Ghee • Butter	Variable. See: https://gifna.who.int/countries/TUV/policies/82252	N/A
Vanuatu	Volumetric excise tax since 2010	• Meat and seafood (sausages, canned meat, preserved fish, caviar, crustaceans, etc)	20 VT/kg	N/A

Country	Tax type & implementation date *(end-date, if any)*	Food categories subject to or exempt from excise tax	Excise tax rate	Nutrient thresholds *(if any)*
		• Sugar (cane, beet, lactose, maple, glucose, fructose, molasses) • Sugar confectionaries • Malt extract, mixes and doughs • Pasta • Tapioca • Cereals		
Mauritius	Sugar content specific excise tax since 1 January 2021	Non-staple sugar sweetened foods, including • Sugar confectionary • Cocoa products • Sweetened dairy products • Cereal and grain products • Ice cream and frozen desserts • Sugar (cane, beet, lactose, maple, glucose, fructose, molasses)	6 cents per grams of sugar	N/A
Brunei	Ad valorem excise tax on ex-factory price since 2017	• Sugar (cane, beet, lactose, maple, glucose, fructose, molasses) • Sugar confectionaries, including chewing gum • Cocoa products	3%	N/A
India	Ad valorem excise tax on ex-factory price since 1 January 2017	• Animal or vegetable fats • Processed meat, fish or aquatic meats • Sweet biscuits and cakes • Sugar (cane, beet, lactose, maple, glucose, fructose, molasses) • Sugar confectionaries, including chewing gum • Cocoa products	6% - 12.5%	N/A
Nepal	Ad valorem excise tax on ex-factory price since 1 January 2022	• Sugar (cane, beet, lactose, maple, glucose, fructose, molasses) • Savory snacks	• Rs 95 per quintal • Rs 17 per kg	N/A
Colombia[97]	Ad valorem excise tax on ex-factory price since 1 Nov 2023	Edible products formulated from food-derived substances along with additives that contain added sugars, added sodium, or added saturated fats including: • milk products added with sugar • sausages and cold cut meats • chocolates and confectionary candies • snacks • bakery products • breakfast cereals • canned fruits and vegetables added with fat, sugar or salt, • jams, jellies and marmalades • sauces, condiments, seasonings Exempt: Colombian traditional foods such as arequipe or dulce de leche, salchichon, oblea, bocadillo.	1 Nov 2023: 10% 1 Nov 2024: 15% 1 Nov 2025: 20%	Products taxed if contain: • ≥10% of total energy from free sugars • ≥10% of total energy from saturated fat • ≥1mg sodium/kcal and/or ≥300 mg sodium /100 g
Mexico[98]	Ad valorem excise tax on ex-factory price since 1 Jan 2014	• Snacks • Sugar confectionaries • Cocoa products • Flans and puddings	8%	Products taxed if contain ≥275 kcals per 100 g

Country	Tax type & implementation date *(end-date, if any)*	Food categories subject to or exempt from excise tax	Excise tax rate	Nutrient thresholds *(if any)*
		• Nut spreads • Sweetened dairy products • Cereal and grain products • Ice cream and frozen desserts		
Paraguay	Ad valorem excise tax since January 2020	• Packaged products excluding oils or fats of animal or vegetable origin	2%	Packaged products >500kcals/100g
Ethiopia	Ad valorem excise tax since 14 Feb 2020	• Fats - Margarine - Hydrogenated fats/oils - Non-hydrogenated fats/oils • Sugar • Salt • Sugar confectionary • Cocoa products	• 50% • 40% • 30% • 20% • 25% • 30% • 30%	Taxed if contain >40% saturated fat, or <0.5% trans fat/100g. Taxes also apply when products fail to indicate saturated or transfat content
Tunisia	Ad valorem excise tax since January 2018	• Sugar confectionary • Select cocoa products • Bakery, pastry or dessert products • Ice cream • Sauces, condiments, seasonings	10%	N/A
Uganda	Volumetric specific excise tax with changes in categories since 2014	• Sugar in solid form (since 2014) • Sugar confectionary (2015- 2018 only) • Cooking oil (since 2018)	• Ushs 100 per kg 100 • Ushs 200/liter	N/A
Hungary[99]	Volumetric specific excise tax for various food categories from 1 September 2011, with increases from 2012 to 2022	• Salty snacks or pasta • Nuts • Seasonings • Marmalades • Pre-packed sugary products • Sugared cocoa powders	Tax ranges from 40-780 HUF depending on various nutrient-thresholds for each food category; see Table 1 in *Csákvári et al.* (https://cejph.szu.cz/pdfs/cjp/2023/01/07.pdf)	
Norway	Volumetric specific excise tax from 1 Jan 2007	• Sugar (cane, beet, lactose, maple, glucose, fructose, molasses) • Sugar confectionaries • Cocoa products	• NOK 6.34/kg • NOK 16.36/ kg	N/A
Denmark[100]	Volumetric specific excise tax from 1 Oct 2011 ***(repealed 31 Dec 2012)***	• Meat, animal fat • Dairy products • Margarine and spreads • Edible vegetable oils and fats • Any products containing the above ingredients	16 DKK/kg of saturated fat	Products taxed if exceeded 2.3g of saturated fat per 100g of fat
Finland	Volumetric specific excise tax from January 2011 ***(repealed Jan 2014)***	• Sugar confectionary • Cocoa products • Ice cream and frozen desserts	75 snt/kg	N/A

Sources: Unless otherwise indicated, excise tax policy information accessed at the WHO Global database on the Implementation of Food and Nutrition Action (GIFNA); see list of countries at https://gifna.who.int/countries

Note: Table excludes countries with sales taxes on foods (Cuba, Kosrae State in Micronesia), countries with excise taxes only on sugar or only on sugar confectionaries (Burundi, Kenya, Liberia, Nicaragua, Timor-Leste, Uruguay), countries with excise taxes only on fats/oils (Malawi, Pakistan, Senegal, Togo), and countries with excise taxes on food categories that are not predominantly HFSS or UPF (Benin, Brazil, Cameroon, Central African Republic, Gabon, Haiti, Malta, Mauritania, Nigeria, Sao Tome and Principe).

6. Revenues generated from UPF excise taxes

Available real-world data on revenues generated from the food component of Hungary's Public Health Promotion Tax and Mexico's non-essential high energy dense food tax are shown in Table 2 below.

After accounting for food prices and inflation that have risen quickly globally since 2020,[101,102] the tax revenue from taxable foods in Hungary was steady over time, representing about 0.04% of the country's gross domestic product (GDP). This highlights the importance of ensuring increases in specific tax level to address inflation, which was something Hungary built into their tax design. It is also worth noting that Hungary's tax design applied food category specific nutrient thresholds, which was reported to encourage reformulation.[77,78] Thus, increases in specific tax levels over time should also be considered in the context of tax designs based on nutrient values if there is also a goal of maintaining steady tax revenues.

Meanwhile, tax revenues from Mexico's ad valorem 8% excise tax on high-energy dense non-essential foods rose over time in nominal terms from US$1 billion in its first year (2014) to US$ 2.07 billion in 2023. After accounting for inflation, the real values of tax revenues are steadier but still rose gradually over time from 0.06 to 0.12% of GDP.

Table 2: Revenue generated from unhealthy foods taxes in Hungary and Mexico

	Year	Nominal revenue from taxed foods (billions of HUF)	Nominal revenue from taxed foods (millions of USD)	Real revenue adjusting for food inflation ‡ (millions of USD)	Revenue as % of GDP *
Hungary[99]	2011 (4 months)	5.5	15.9	16.0	0.01% (0.03% annual)
	2012	17	49.2	46.4	0.04%
	2013	16.8	48.6	44.7	0.04%
	2014	16.9	48.9	45.3	0.03%
	2015	17.2	49.7	45.8	0.04%
	2016	18	52.1	47.8	0.04%
	2017	19	54.9	49.2	0.04%
	2018	20	57.8	49.8	0.04%
	2019	25	72.3	59.2	0.04%
	2020	26	75.2	57.4	0.05%
	Year	**Nominal Revenue from taxed foods (millions of M$)**	**Nominal Revenue from taxed foods (billions of USD)**	**Real revenue adjusting for food inflation‡ (billions of USD)**	**Revenue as % of GDP ***
Mexico[104]	2014	13,666.10	0.81	0.81	0.06%
	2015	15,926.19	0.94	0.90	0.08%
	2016	16,929.52	1.00	0.92	0.09%
	2017	18,339.36	1.08	0.93	0.09%
	2018	23,112.01	1.36	1.12	0.11%
	2019	21,422.15	1.26	0.99	0.10%
	2020	21,049.42	1.24	0.92	0.11%
	2021	25,590.18	1.51	1.04	0.12%
	2022	30,333.38	1.79	1.09	0.12%
	2023	35,139.57	2.07	1.20	Not yet available

Notes: For Hungary, nominal revenues come from Figure 1 in *Csákvári et al.* looking only at revenues from solid foods and excluding liquids (beverages)[99]
For Mexico, data comes from the Tax Administration Service (Servicio de Administracion Tributaria) of Mexico[104]
Exchange rates from each country as of December 31st, 2023 provided by FiscalData.Treasury.gov.[105]
‡ Annual food inflation statistics from the Organisation for Economic Co-operation and Development (OECD).[106]
* GDP data from the World Bank.[107]

While there are no reported breakdowns of tax revenues from Denmark's short-lived 15-month saturated fat tax, it is reported to have raised US$ 216 million in total tax revenue. Pro-rating to 12 months, this represented about 0.06% of the country's GDP in 2012.[103]

Estimated tax revenues available in the literature for countries that have not yet implemented health excise taxes on HFSS or UPF products are shown in Table 3. Of these simulations, only the study for the United States looked at the tax burden by household income. They found that the majority (about 75%) of the tax revenue would be coming from higher-income households.[63] This is because lower-income households tend to be more price sensitive (i.e., show higher price elasticity of demand), and so are more likely to reduce their consumption of taxable HFSS or UPF items; This speaks to how health taxes can be progressive for health.

A major limitation of revenue estimates from simulated HFSS or UPF taxes is that while they can account for consumer responses via price-elasticities of demand, they are unable to account for industry responses in terms of reformulations, particularly when the tax designs are tied to nutrient content or densities. Assuming that such tax designs will illicit some reductions in such nutrients (as have been shown to be the case for similar policies),[64-66] then we should expect that the estimated tax revenues are overestimates.

Table 3: Estimated tax revenues for various HFSS or UPF taxes

Country	Simulated tax design *[All defined based on nutrient thresholds]*	Estimated annual tax revenue (USD)	Estimated revenue as % GDP* (2024)
Chile[62]	Ad valorem excise tax on warning-labeled items *(foods only)*:		
	10%	$ 266.92 million	0.096%
	20%	$ 491.43 million	0.177%
	30%	$ 744.69 million	0.268%
	Ad valorem excise tax on warning-labeled items *(foods and beverages)*:		
	10%	$ 533.71 million	0.192%
	20%	$ 1.002 billion	0.360%
	30%	$ 1.517 billion	0.546%
United States[63]	Ad valorem excise tax of 8% on certain foods *(ultra-processed dairy, snacks, sweets)*	$ 6.873 billion	0.024%
	Combination of the 8% ad valorem excise tax on HFSS food categories, and a volumetric tiered tax on SSBs based on sugar content	$ 13.4 billion	0.047%
India[60]		**Percent increase in tax revenue from product**	
	Ad valorem excise tax on sugar^		
	10%	46-53%	
	20%	86-104%	
	30%	119-153%	
	Ad valorem excise tax on HFSS foods^		
	10%	69-75%	
	20%	125-141%	
	30%	168-200%	

Notes: * GDP data from the International Monetary Fund World Economic Outlook.[108]

^ Estimated tax revenue increases for India include revenue from an existing 18% goods and services tax on sugar and 12% goods and services tax on HFSS foods, respectively

7. Summary and conclusions

The prevalence of NCDs continues to increase globally, with LMICs taking on an increasing share of the burden.[109,110] These trends are occurring in the context of increasing availability, affordability and thus sales and consumption of UPFs and HFSS products in LMICs. A range of policy options are needed to reduce the consumption of these harmful products. Meaningful excise taxes on UPF or HFSS products have the potential to shift relative prices and demand and may result in beneficial health impacts over time while raising revenue. There is momentum from many countries, especially island nations and Latin America around such taxes due to both health and environmental concerns – in Latin America there are also integrated policies (of which excise taxes are one component) aimed at reducing UPF consumption and supporting consumption of less processed alternatives.

Real-world implementation and evaluations of excise taxes on UPF or HFSS products is still limited, so there are gaps in our understanding of the various short- and long-term impacts of UPF/HFSS excise taxes on various stakeholders. Excise taxes on UPF/HFSS categories to date show that they reduce UPF/HFSS purchases and consumption – but tax type, tax levels and the included tax base could be improved. The latest UPF excise tax being implemented in Colombia with increasing tax rates over time will provide more insights. UPF/HFSS taxes are thus promising policy options and can help generate new and sustainable revenue, especially if the taxes are designed to account for inflation and use stricter nutrient thresholds over time alongside rising tax rates or levels. More countries need to explore such taxes and consider these various tax design issues given their specific contexts. Arguments that will be raised about the income regressivity of such taxes need to be addressed despite excise taxes on UPF/HFSS products already being progressive for health. Thoughtful tax revenue use can mitigate such concerns, improve equity, and garner support from the public.

As countries consider taxes on UPF or HFSS products, there will be strong industry opposition and lobbying to prevent, delay, or diminish the possibility of such taxes being passed and implemented. Ministries of Finance and tax authorities should coordinate with other ministries such as Health, Agriculture, Commerce, Social Development, and Education to identify ways to generate win-wins. New tax revenues being invested towards efforts like supporting school feeding programs – with some share of food sources coming from small domestic farmers and businesses – can lead to improved child nutrition and learning, economic development, food supply chain resiliency, and generate wider multiplier effects. Such cross-ministerial policy coherencies and integration will allow for greater gains in health and longer-term economic well-being.

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