



Viewpoint

Viewpoint: Soda taxes – Four questions economists need to address

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ABSTRACT

The popularity of soda taxes as a public health policy has grown rapidly in the last few years. While the evidence that the tax works in reducing the purchases of soda is emerging, there are a number of questions that are yet to be answered before the broader effectiveness of this measure can be determined. Beyond health effects, there is more specifically a need to better understand the economic mechanisms of change, redistributive effects, as well as causal and spillover effects in food systems and economy more broadly.

0. Introduction

In the last few years the list of countries that have implemented a soda tax, or plan to, has grown rapidly (see Table 1). The popularity of this upstream public health policy, designed to reduce consumption of sugar, is exceptional. The first ex-post evaluations suggest soda taxes work in reducing purchases of taxed products (see Table 2). In Mexico, the demand for sugary drinks fell by 6–9% in the first two years after implementation of a tax that increased price on average by 10% (Colchero et al., 2017b, Colchero et al., 2015). In Berkeley, California, sales data indicated a 9% decline in purchases, while self-reported changes in consumption amounted to a 21% reduction of taxed sodas (Falbe et al., 2016, Silver et al., 2017). In Finland, Hungary and France, although rigorous evaluations have not yet been undertaken, reports also indicate reductions in demand (Cornelsen and Carreido, 2015). Yet, while seemingly straightforward, the effects become complex once we look deeper and wider (Penney et al., 2017). How thoroughly do we understand the direct and indirect mechanisms and effects of these taxes; not only on health outcomes but also on the wider economy? In this viewpoint, we outline four core questions that require greater engagement from economists in the design and evaluation of this health policy intervention to ensure it meets its potential.

1. Mechanism for behaviour change: Price or signalling effect?

Implementation of soda tax is generally preceded and accompanied with significant debates in the media between specialists and advocates from both (public) health and the food industry. The former generally focus on the negative health effects of (over) consuming sugar or sodas and its associations with obesity and disease; calling for measures such

as the tax and suggesting that revenues, if earmarked for health, nutrition or education, can yield even greater benefits (Niederdeppe et al., 2013, Nixon et al., 2015, Elliott-Green et al., 2016, Jeong et al., 2014). The pro-industry coverage emphasises the importance of consumer choice, individual responsibility and exercise, disassociates the products from negative health outcomes and generally refers to the tax as a regressive measure with negative consequences on the poor, jobs and the economy (Niederdeppe et al., 2013, Nixon et al., 2015, Elliott-Green et al., 2016).

The question therefore arises of whether the price increase that the tax eventually causes (which could both fall short or exceed the expected value of the tax (Berardi et al., 2016, Falbe et al., 2015, Cawley and Frisvold, 2017, Silver et al., 2017, Colchero et al., 2015)), is the main driver for behaviour change, such as observed in Berkeley and Mexico, or the framing of the tax as a health (or economy) related measure, including in the media, has a significant role?

For example, a recent study analysing changes in the sales from a voluntary levy on sugary drinks, implemented in a chain of 37 restaurants in the UK, found a large reduction in the sales (9.3%) relative to a modest increase in price (about 3.5%). However, the levy was supported with different activities, including redesigned beverage menu with text explaining why the levy was introduced, new products on the drinks menu as well as numerous articles in press and a documentary screened in a national TV channel, so it is likely that these other activities also influenced consumer behaviour (Cornelsen et al., 2017).

A study reviewing British mainstream media in 2014 found 374 articles published on sugar-sweetened beverages (more than one article per day). Of these, 81% suggested that these drinks are unhealthy, although only 24% suggested any policy change (Elliott-Green et al., 2016). In the USA, local taxes are being voted for in a ballot which is

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Table 1
Planned and recently implemented soda taxes.

| Country | Date | Details |
|-------------------------------|------------------------------------|--|
| <i>Planned</i> | | |
| South Africa | April 2018 | Tax on sugary beverages at a rate of 2.1c per g of sugar in each 100ml beyond 4g/100ml (National Treasury Republic of South Africa, 2016, National Treasury Republic of South Africa, 2017) |
| United Kingdom | April 2018 | Two-tiered levy on producers of sugary beverages. Tax rates are £0.18/L for drinks containing 5–8 g of sugar/100 ml and £0.24 for drinks containing > 8 g of sugar/100 ml; revenues earmarked for school sports and educational programs (HM Treasury, 2016b) |
| Ireland | April 2018 | Follows proposals of the UK levy (above). Tax rates will be €0.2/L for drinks containing 5–8 g of sugar/100 ml and €0.3 for drinks containing > 8 g of sugar/100 ml (Department of Finance, 2016) |
| Seattle (US) | January 2018 | 1.75-cent tax on distributors of sodas, sports drinks, energy drinks and other sweet drinks (Office of the City Clerk 2017, Norimine, 2017) |
| San Francisco (US) | January 2018 | 1-cent per fluid ounce excise tax on the distribution of sugar-sweetened beverages. (Treasurer&Tax Collector, 2017) |
| <i>Delayed</i> | | |
| Estonia | Intended January 2018; delayed | Two-tiered levy on producers of sugary beverages. Tax rates are €0.1/L for drinks containing artificial sweeteners, juices with no added sugar or added sugar up to 8 g/100 ml; €0.3/L for drinks with > 8 g of sugar/100 ml. To allow for reformulation the €0.3 rate was initially set with a threshold of 10 g of sugar/100 ml (2018), then 9 g (2019) and 8 g by 2020 (Veerman and Thai, 2017, WHO, 2017, ERR, 2017) |
| <i>Implemented since 2015</i> | | |
| United Arab Emirates | October 2017 | An excise tax of 50% on carbonated drinks and 100% on energy drinks (Burki, 2017, WCRF, 2017) |
| Thailand | September 2017 | An excise tax levied on sugar-sweetened beverages over 6-year phased period to encourage reformulation. Tax rates to be announced; drinks divided into five categories based on sugar content per 100 g: below 6 g, 6–10 g, more than 10–14 g, more than 14–18 g and more than 18 g (Chantanusornsiri, 2017, Jitpleecheep, 2017) |
| Cook County, IL (US) | August 2017; Repealed October 2017 | 1-cent per ounce tax on sugar-sweetened beverages sold at retail in the County. Exclusions include milk products, 100% juice, diet drinks. The distributor or retailer must include the tax in the sale price of the sweetened beverages (Cook County Government, 2017) |
| Boulder, CO (US) | July 2017 | 2-cent per fluid ounce of sugar-sweetened beverage product excise tax on the distributors of the beverages (containing at least 5 g of added caloric sweetener per 12 oz) (City of Boulder, 2017) |
| Oakland, CA (US) | July 2017 | 1-cent per fluid ounce excise tax on the distribution of sugar-sweetened beverages containing at least 2 kcal/ounce. (City of Oakland, 2016) |
| Saudi Arabia | June 2017 | An excise tax of 50% on carbonated drinks and 100% on energy drinks (WCRF, 2017) |
| Albany, CA (US) | April 2017 | 1-cent per fluid ounce excise tax on the distribution of sugar-sweetened beverages (defined as containing at least 2 kcal per ounce and added sweetener). (City of Albany, 2017) |
| Catalonia (Spain) | April 2017 | Two-tiered tax on drinks that contain added caloric sweeteners. Tax rates are €0.08/L for drinks with 5–8 g of sugar per 100 ml, €0.12 for drinks with > 8 g of sugar per 100 ml. Tax is mandatory to pass through to sales prices (Baquero, 2017, Agencia Tributaria de Catalunya, 2017, Generalitat de Catalunya, 2017) |
| Brunei | April 2017 | Excise duty of (~\$0.28/L) of SSBs with > 6 g of total sugar per 100 ml (WCRF, 2017) |
| Portugal | February 2017 | Special Consumption Tax (VAT). Drinks with < 8 g of sugar/100 ml are taxed at €8.2 per 100 L, and drinks with > 8 g of sugar/100 ml are taxed at €16.46 per 100 L. (Agence France-Presse, 2016, The Portugal News Online, 2017, Autoridade Tributaria e Aduaneira, 2017) |
| Philadelphia (US) | January 2017 | 1.5-cents per ounce excise tax on distributors of sugar-sweetened beverages. (City of Philadelphia, 2017) |
| Dominica | September 2015 | 10% excise tax to drinks with high sugar content (WCRF, 2017) |
| Barbados | September 2015 | 10% excise tax on sugar sweetened beverages (Alvarado et al., 2017) |
| Mauritius | October 2016 | Excise tax of ~\$0.08 per 100 g of sugar content in beverages containing sugar, including juices, milk based beverages and soft drinks (WCRF, 2017) |
| Belgium | January 2016 | Excise tax (€0.068/L) on all non-alcoholic beverages with added sugar or sweeteners (WCRF, 2017) |
| Berkley, CA (US) | January 2015 | 1-cent per fluid ounce excise tax on the distribution of sugar-sweetened beverages (containing 2 or more calories per ounce of beverage with added caloric sweetener). (City of Berkeley, 2017) |
| Chile | January 2015 | Two-tiered ad-valorem tax on sweetened beverages. An existing 13% tax rate was increased to 18% for high-sugar drinks (> 6.25 g of sugar/100 ml) and reduced to 10% for drinks below the threshold (WCRF, 2017) |

preceded with explicit campaigns on both sides (Paarberg et al., 2017) and is likely to raise awareness. Such framing effects are very difficult to measure as the information in media appears over time and starts well before a tax is implemented. However, for example, a study of a relatively small, 5% sales tax on soft drinks in two states in the USA (Maine and Ohio), unrelated to health, found no changes in sales arising from this measure (Calantuoni and Rojas, 2015) suggesting also that price may not be the only driver.

A further, related, issue that may determine the effectiveness of the tax is whether, once introduced, the tax is signalled to the consumer on the price tag, shelf price or receipt serving as a reminder of the tax. There is emerging literature (particularly from the USA) on tax salience suggesting that taxes which are posted in prices reduce consumption more than increases in taxes which are added at the register (Chetty et al., 2009, Chen et al., 2015, Zheng et al., 2013). This issue has not been extensively studied in the context of soda taxes but it relates back to the design of the taxes and at which stage of the supply chain the tax is applied (e.g. if levied on the producer or the retailer).

If taxes indeed are more salient and consumer response stronger

when tax is posted in the price (or additionally signalled), there are important implications to revenue collection from the tax. Simply put, if the aim is to raise revenue, the tax should not be posted and if the aim is to reduce consumption, the tax should be posted and well signalled to the consumer. Contrary to cigarette taxes, the ability of a soda tax to raise revenue is already more limited because the own-price elasticity is greater (in absolute terms) for sodas (estimated at -0.8 to -1.2 by meta-analyses vs -0.4 to -0.7 for cigarettes (Andreyeva et al., 2010, Cabrera Escobar et al., 2013, Green et al., 2013, Jha, 2009, Gallet and List, 2003, IARC, 2011)).

2. Comprehensiveness of the purchasing behaviours: Are we getting the full picture?

When it comes to the effectiveness of soda taxes, evidence stems largely from data collected on purchases for at-home consumption (i.e. based on home-scan data). Beyond experimental studies, there is little evidence on how a soda tax influences consumer purchases out-of-home; for example in work places, cafeterias and (fast-food)

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