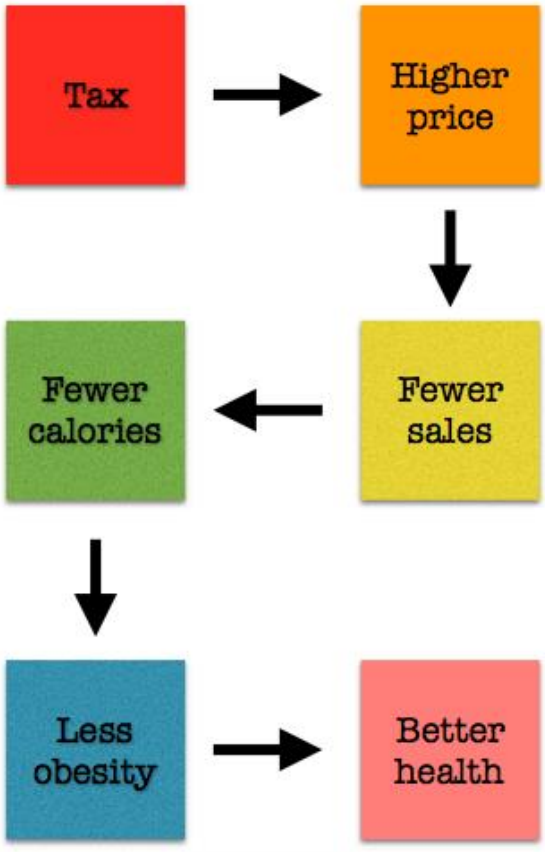
Sugar taxes: A Briefing

Taxing food and soft drinks in the name of obesity is not a new idea. Dozens of jurisdictions have experimented with such taxes over the years, allowing economists to study their impact. The results have consistently showed the following:

- Demand for sugary drinks, snacks and fatty foods is inelastic. People tend to be quite unresponsive to price hikes and do not significantly change their shopping habits.
- Consumers respond by switching to cheaper brands of the product or shopping in cheaper shops. This leads to the consumption of inferior goods rather than the consumption of fewer calories.
- Taxes on sugary drinks lead consumers to switch to other high calorie drinks such as fruit juice, milk or alcohol.
- Taxes on energy-dense food and soft drinks take a greater share of income from the poor than the rich. This regressive effect is exacerbated by low income consumers being less responsive to price changes than the rich.
- No impact on obesity or health outcomes has ever been found.

How a sugar tax is supposed to work

There is growing interest in the idea of taxing sugar as a way to reduce rates of obesity. Figure 1 (right) shows how such a tax is supposed to work. The tax raises the price of the targeted product which leads to a decline in sales. This decline in sales leads to people consuming fewer calories, thereby reducing the prevalence of obesity. Since obesity is related to several adverse health conditions, this leads to fewer people becoming ill. The economic (as opposed to political or social) justification for this is that illnesses from obesity impose externalities or "spillover" costs on the rest of society. (See Snowdon (2015) for an analysis of the economic costs of obesity to the taxpayer.)



Each link in the chain of events seems to follow logically to the next, leading campaigners to portray taxation as a simple way of reducing obesity-related diseases and hence costs on society. Upon closer inspection, however, it becomes clear that the chain will break down if any of the underlying assumptions are incorrect. The model only works if consumers behave as the campaigners want them to, but this is far from certain. People respond to incentives, but not always as the government would like.

Unintended consequences

There are several ways in which the chain from taxation to better health could break down:

Scenario 1: Businesses decide to absorb the tax rather than pass it on to customers in the form of higher prices. If prices do not rise, industry profits will decline but sales would not be expected to fall.

Scenario 2: The tax is not absorbed by industry but consumers value the product enough to absorb higher prices by making cuts in other parts of their household budget. Instead of buying less of the targeted product, consumers who have *inelastic demand* spend less on other products, work longer hours or borrow more money. In other words, they do buy less, but not significantly less.

Scenario 3: Consumers respond to the tax by switching to cheaper brands of the product or shopping in cheaper shops. If the tax is levied at a very high rate it might even drive consumers towards the black market. Consumers who downshift to cheaper brands will suffer a *welfare loss* from the consumption of inferior goods but will not consume fewer calories and therefore will be no less likely to be obese.

Scenario 4: Consumers buy less of the targeted product but buy more of other high-calorie products. For example, they might consume less lemonade but buy more beer, or they might purchase less cola but buy more chocolate. As a result of these *substitution effects*, the tax leads to fewer sales of one product without reducing calorie consumption.

How taxes on food and soft drinks work in practice

Several countries have implemented taxes on sugary drinks, saturated fat, confectionery, chocolate and/or ice cream. As many as 33 US states have 'soda' taxes in place and France introduced a modest tax on all fizzy drinks (including low calorie versions) in 2012. Hungary and Finland both tax a range of high calorie food products as well as sugary soft drinks. Mexico introduced a sugary drinks tax of around 10 per cent in January 2014. Denmark introduced a wide-ranging tax on saturated fat in October 2011 before repealing it in January 2013. The Danes also had a tax on soft drinks in place for 80 years before repealing it in 2014.

The evidence from these real-world experiments shows that unintended consequences are common whereas the intended chain of events shown in Figure 1 is rare. All four of the scenarios listed above have been observed at one time or another.

Impact on price

Although industry is sometimes able to absorb some or all of the tax without raising prices, experience has shown that businesses are more likely to increase profits by raising prices beyond what is needed to accommodate the tax. When Berkeley, California introduced a soda tax in 2015, Cawley and Frisvold (2015) found 'retail prices rose by less than half of the amount of the tax'. However, this was 'in contrast to much of the previous literature on the pass-through of taxes, which tended to find full or even overshifting of taxes.' The Berkeley effect may be due to price competition from neighbouring areas which do not have a soda tax. In Denmark, Finland and France, taxes on sweet foods, fat and sugary drinks have typically been associated with price rises that were higher than expected given the rate of tax (ECSIP 2014: 25). Likewise, preliminary evidence from Mexico suggests that '[p]rices of regular sodas jumped by more than the amount of the tax' (Grogger 2015). This may seem counter-intuitive. Why would suppliers not increase prices in any case, even without the tax if they wished to do so? The answer to this might be that, in the short run at least, prices can be 'sticky'. If it is required that firms increase prices, they may take the opportunity to factor in price increases that they would have liked to implement in any case. However, it would be reasonable to suppose that, overall, in the long term, the tax will be passed on in total to the consumer more or less in its entirety.

Impact on consumption

Basic economic theory predicts that higher prices will generally lead to less demand. However, there are a number of factors at work. If a product makes up a high proportion of people's budgets, in effect their real incomes have been reduced too and they will take other decisions to change their shopping habits as a result. Those changes may offset the direct effect of higher prices.

The extent to which consumption falls in response to higher prices depends on, amongst other things, how important the product is to the consumer. Food and drink are the cornerstones of the household budget and most people are reluctant to change their consumption habits unless prices change dramatically. Economic evidence shows that the demand for soft drinks is inelastic, which is to say that a one per cent increase in price leads to a *less than* one per cent decline in consumption.

It is unusual for a 'sin tax' on food and soft drinks to have no effect on consumption, but the effect is usually quite trivial. For example, a 13.1 per cent increase in the price of butter resulting from the Danish fat tax was associated with a modest 5.5 per cent decline in sales. Similarly, a 14.8 per cent increase in the price of confectionary in Finland coincided with a mere 2.6 per cent drop in consumption. When the price of soft drinks rose by 7.3 per cent for two years running in Finland, consumption fell by less than one per cent in the first year and by 3.1 per cent in the second year (ECSIP 2014: 34). A ten per cent tax on sugary drinks in Mexico - the poorest country to have experimented with such a policy - was associated with a six per cent decline in sales (Colchero et al. 2016).

It is impossible to tell how much of these sale declines were due to the taxes. Most of them took place in the early 2010s when the European economy was performing badly and sugary drink sales in Mexico were in decline before the tax was introduced. However, enough evidence exists to support the general conclusion that demand for food and soft drinks is inelastic and that taxes levied on them tend to have only a small effect on consumption.[1]

Taxing cigarettes is often cited as a precedent for taxing food and drink. However, this comparison is flawed. The most obvious reason is because the scale of tobacco taxation is vastly higher (around 700 per cent for cigarettes compared with 10-20 per cent proposed for sugary drinks). There is no serious proposal to increase the cost of sugary drinks to the extent that the cost of cigarettes has been increased.

In addition, all the substitutes for cigarettes, such as nicotine gum and e-cigarettes, are much less hazardous to health. Any increase in tobacco duty therefore presents smokers who are not prepared to pay more with the choice of reducing their cigarette consumption, giving up smoking or switching to a safer nicotine product. Any of these would likely benefit their health. Food is very different. Unlike smoking, food is a biological necessity. If one source of calories becomes more expensive, consumers will switch to another food or drink product or to a cheaper variety of the same product. There is no guarantee that the substitute products will have fewer calories or be better for health. Since humans are hard-wired to seek out energy-dense food, the most likely effect of taxing calorific products is, as Ryan Edwards notes in *Preventive Medicine*, that 'consumers will probably increase their demand for cheaper calories, leaving obesity unchanged' (Edwards 2012: 284).

High calorie substitutes for sugar-sweetened beverages include fruit juice, full fat milk, wine and beer. Evidence shows that people do indeed switch to these drinks to some extent when sugar-sweetened beverages are taxed (Dharmasena and Capps 2011). Studying the effect of soda taxes on children and adolescents in the USA, Fletcher et al. (2010) found a 'modest reduction in soft drink consumption' but no effect on obesity because 'any reduction in soft drink consumption has been offset by the consumption of other calories'.

[1] It has been claimed that Denmark's fat tax reduced consumption of fatty products by 10-15 per cent but this is misleading. The figure comes from a study which looked at the first three months of the new tax regime when consumers were using up the large number of products they had hoarded in the days before prices rose (Jensen and Smed 2013). Researchers who have looked at the whole timeframe have found that the decline in sales was much lower than 10-15 per cent (see Bødker et al. (2015) and ECSIP (2014: 34)).

Danish consumers responded to the tax on saturated fat by switching to cheaper brands of the same fatty products and shopping in discount stores (Jensen and Smed 2013). Some even began to shop in Germany and Sweden to take advantage of lower prices. In Hungary, where a tax covers a wide range of energy-dense foods and drinks, there is clear evidence of shoppers downshifting to cheaper brands. Likewise, cheaper confectionery, ice cream and soft drinks have won out over premium brands in Finland (ECSIP 2014: 45).

Impact on health

Sugary drinks provide only a small fraction of the population's energy intake (three per cent in Britain) and they are disproportionately consumed by people aged 11-18 years who are least likely to be obese. Since soft drink taxes have only a modest effect on the consumption of this relatively minor source of calories, it should not be surprising that there is virtually no evidence that sugary drink taxes have reduced obesity or improved health anywhere in the world. Studying soda taxes in the USA, Fitts and Vader (2013) concluded that their research 'does not support the theory that soda taxes have a negative effect on body-mass index' (Fitts and Vader 2013). In line with Fletcher et al. (2010) and others, Powell et al. (2009) found 'no statistically significant associations between state-level soda taxes and adolescent [body mass index]'. Another study from the USA found that changes in food prices had no effect on rates of obesity (Han and Powell 2011).

It has been suggested that many of the sugary drink taxes in place in the USA are not large enough to have a measurable effect on obesity. However, when Fletcher et al. (2014) studied US jurisdictions where soda taxes are unusually high they still failed to find any effect. They reported that 'our results cast serious doubt on the assumptions that proponents of large soda taxes make on its likely impacts on population weight. Together with evidence of important substitution patterns in response to soda taxes that offset any caloric reductions in soda consumption, our results suggest that fundamental changes to policy proposals relying on large soda taxes to be a key component in reducing population weight are required.'

Less evidence is available for Europe. A 2014 review for the European Commission noted that 'food taxes are so far only levied on products which represent a relatively small percentage of consumption of the targeted nutrients' and that 'there are as yet no robust conclusions on the impact of food taxes on public health' (ECSIP 2014: 46). It is clear, however, that even the wide-ranging food tax regime of Hungary only affects a fraction of the calorie supply.

Early evidence from Mexico suggests that a ten per cent tax on sugary drinks led to an average daily decline in consumption of 36ml per person (Colchero et al. 2016). As Tom Sanders, a professor of nutrition and dietetics, notes, this is the equivalent of 16 calories and is 'a drop in the caloric ocean. Long-term reductions in total energy in the range of 300-500 kcal/d are probably needed to prevent obesity' (Science Media Centre 2016). Since disposable incomes are considerably higher in Western nations than they are in Mexico it is unlikely that a soft drink tax in the UK would make sales fall to the same extent.

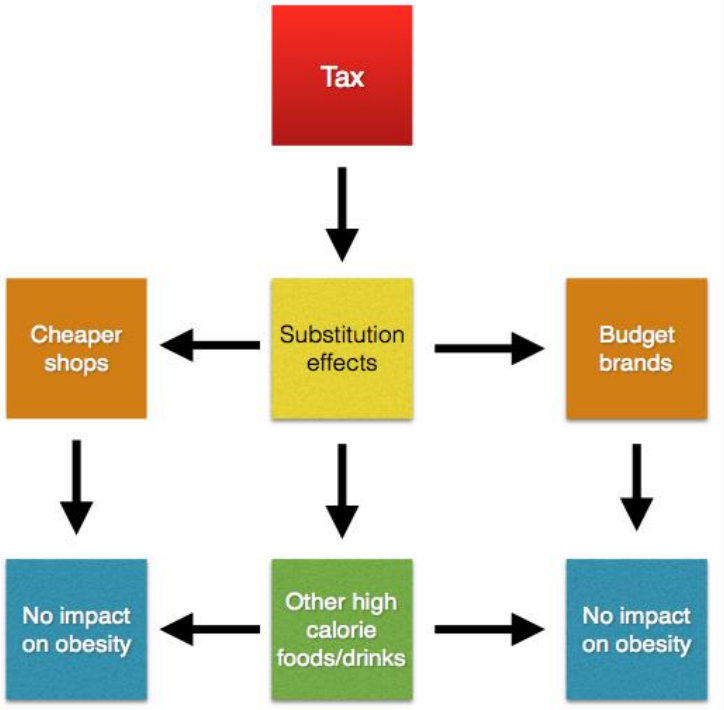
Other considerations

Any sugar tax is likely to be highly regressive as the poor spend a much higher proportion of their income on the relevant products than the rich. To justify the tax, there would have to be strong evidence that the poor were more price sensitive. This is unlikely to be so given that they are choosing to spend a large proportion of their income on the product and that the poor will seek out cheaper substitutes to existing sources of sugar. Obese people are also more likely to have price inelastic behaviour or to seek out subsidies. The heaviest consumers (in both senses of the word) tend to be least responsive to prices changes, as are the heaviest consumers of alcohol and tobacco.

Conclusion

The evidence for taxing soft drinks (or any other source of calories) as a means of reducing obesity is weak and largely theoretical. In practice, people in prosperous countries are not easy to manipulate with blunt tax instruments given the diverse food environment. The seemingly simple chain of events shown in Figure 1 becomes more complex when substitution effects and unintended consequences are taken into account (see Figure 2).

After reading 880 studies for a systematic review, Shemilt et al. (2013: 11) concluded that 'the public health case for using economic instruments to promote dietary and physical activity behaviour change may be less compelling than some proponents have claimed'. There is a striking contrast between theoretical studies, which generally predict that such taxes 'work', and studies of hard data in places that have actually implemented them, which generally show the opposite. Lacking real world evidence that sugar taxes are effective as health measures, campaigners continue to cite findings from crude economic models which do not adequately account for the ability of consumers to choose cheaper or discounted brands, to shop at cheaper shops and to switch to alternative high-calorie food and drink products.



Even given the strong presumption that sugar taxes do not work, it could be argued that there is no harm in trying, but this is to disregard the costs and harms associated with taxing popular food and drink products. There is no doubt that such taxes hit the poor hardest and even those who believe they would 'work' (ie. reduce obesity) predict that they would work least well with people on low incomes who are least responsive to changes in the price of soft drinks (Briggs et al. 2013). Moreover, such taxes tend to fuel inflation, create unnecessary bureaucracy and place a deadweight cost on consumers[2]. The cost of a 20 per cent sugary drinks tax to Britain would not be trivial. Proponents of the tax estimate that it will cost taxpayers an additional £1 billion per annum whereas the putative savings to the health service amount to just £15 million per annum (Boseley 2015).

As a result of the negative side effects associated with food and drink taxes, they tend to be unpopular unless levied at such a low rate as to go virtually unnoticed (as in France). Within a year of Denmark

[2] When the government of Iceland abolished its sugar tax in 2015, it said the change 'greatly simplifies the system, as well as benefiting households and abolishing an obsolete consumption steering mechanism. With this, the price of various common consumer goods will decline markedly, with the associated positive impact on the price level.'
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introducing its fat tax, 70 per cent of Danes considered it to be ‘bad’ or ‘very bad’ and 80 per cent said it had not changed their purchasing habits.

Jack Winkler, a professor of nutrition policy, remarked in 2013 that after the ‘pasty tax’ controversy ‘no rational British politician would risk antagonising voters by supporting an even higher tax on an even more popular product for such negligible gains’ (Winkler 2013). Since Winkler made his prediction there has been a highly effective campaign for a tax on sugar, starting with soft drinks, involving Action on Sugar - a pressure group formed in 2014 - and the celebrity chef Jamie Oliver. The campaign is gathering momentum but the problems associated with food and drink taxes remain the same. They are ineffective, regressive, inefficient and unpopular.

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