

Item #3

Sugar tax: plain English document

Incomplete draft plain English summary of sugar taxes evidence, written for internal use only (contains some errors), 30 September 2014

Sugar taxes: Summary of the economic evidence

1. Introduction

Obesity is a major problem in New Zealand. 31% of New Zealand adults are obese,¹ and obesity is projected to overtake tobacco as the largest cause of health loss by 2016.² Sugar consumption is a contributor to high obesity rates and is also associated with type 2 diabetes.

New Zealanders consume far more sugar than is healthy. The World Health Organisation recommends a maximum daily intake of 50 grams, but the average New Zealander consumes about twice this much.³

The idea of taxing sugar to reduce sugar intake and curb obesity has received increasing attention from policymakers, academics and the media. Many sugar taxes are aimed at **sugar-sweetened beverages (SSBs)**, which are a large source of sugar intake and have little nutritional value.⁴ Other proposed taxes are broader than this.

The economic rationale for government intervention on sugar rests on market failure and correcting inequalities. The price of sugar may not reflect its full external costs: for example, increased health costs or decreased productivity that can result from overconsumption. Consumers (especially children) might also lack information about some of the negative health effects (or the extent of these) from excess sugar consumption.

The process through which a sugar tax is intended to reduce excess consumption and obesity is shown below:



This paper summarises and evaluates the economic evidence on a sugar tax at each point.

2. International practice

Taxes on sugary foods and drinks have a long history, but it is only very recently that they have begun to be used with the specific intention of curbing obesity. The following table shows a selection of countries which have implemented obesity-targeting sugar taxes:

Country	Date implemented	Scope of tax
Mexico	2013	Soft drinks and high-sugar foods
France	2012	All sweetened beverages (including artificially-sweetened)
Hungary	2011	Soft drinks, energy drinks, sweets, other high-sugar foods
Finland	2011-12	Confectionery and soft drinks
Samoa	2008	Soft drinks
Fiji	2006	Soft drinks

¹ Ministry of Health.

² Ministry of Health (2013).

³ NZ females consume an average of 96g of sugar a day and males 120g a day. See University of Otago and Ministry of Health (2011) at page 76.

⁴ See Fletcher et al (2014) at page 1.

Key messages

- Sugar taxes are **starting to be used in several countries** to fight obesity.
- Sugar taxes are **likely to increase the price and reduce consumption** of taxed items.
- It is **not clear whether they would reduce overall calorie intake**, because people may just switch to other high-calorie items.
- It is not clear how tax-induced calorie reductions would **affect population weight and obesity**.
- Sugar taxes are **probably regressive**, although the health effects may be progressive.
- The **overseas evidence** on sugar taxes may not apply perfectly to New Zealand.

3. What does the evidence say?

Would a sugar tax increase the price of high-sugar products?

A sugar tax is likely to increase the price of the taxed goods.⁵ Less clear is how large the price increase would be. Conventional economic theory states that prices usually increase by less than the amount of a tax, because the producer absorbs some of the cost themselves.⁶

However, there is evidence that in markets with only a small number of sellers, excise taxes may increase by **more** than the amount of the tax. This has been observed to happen with sugar taxes in other countries.⁷ The same is not true for sales taxes, however.⁸ It is possible that this effect might be even greater in New Zealand, because our grocery market is largely dominated by only two firms.⁹

Example study

Bonnet and Requillart (2011) modelled the effect of both excise and sales taxes on soft drinks in France. The excise taxes modelled varied in size from 7.4 cents per litre to 10.5 cents per litre. The sales tax was modelled by a VAT increase of 14.1 percentage points. They found that soft drink excise taxes led to a price increase of 1.07 to 1.33 times the size of the tax. Soft drink sales taxes led to a price increase of 0.6 to 0.9 times the size of the tax.

Would a sugar tax reduce consumption of high-sugar products?

The next question is whether a price increase would cause a reduction in the consumption of the taxed products. Economics expect that an increase in price will lead to a decrease in consumption, and this is supported by the evidence on a sugar tax.

The real issue is how large the reduction would be:

- For soft drinks, every 1% increase in price may lead to a consumption decrease of around 0.6% to 1.2%. For other SSBs, such as sports drinks, decreases may be larger.¹⁰
- If a tax is aimed at sugary foods in general, the overall effect is less clear because there are so many different products which could be affected. However, the evidence indicates that significant decreases in sugar consumption are likely to occur.¹¹

Example study

Zhen et. al (2013) used a demand system model to estimate the effect of a half-cent per ounce (\$0.17 per litre) tax on SSBs in the USA. They found that every 1% price increase would decrease consumption by 1.035% for regular soft drinks, 1.192% for juice drinks, and 2.363% for energy and sports drinks.

Would a sugar tax reduce calorie intake?

The most controversial issue is whether these decreases in consumption would lead to a decrease in total calorie intake. While it seems clear that a tax will decrease consumption of the taxed items, **it is possible that consumers may switch to purchasing other high-calorie items which are not affected by the price increase.** If this 'substitution effect' is large enough, there may be little or no effect on people's total calorie intake.

A number of studies have identified this effect. Many find that it is small enough so that overall calorie consumption still declines. Others have found that it might be large enough to offset any initial calorie decrease.¹²

⁵ See Finkelstein (2013), Bonnet and Requillart (2011) and Bergman and Hansen (2010).

⁶ Jonathan Gruber, *Public Finance and Public Policy*, 4th ed. (New York: Worth, 2013), 559-561.

⁷ For a discussion of this see Finkelstein (2013), 226.

⁸ The difference between sales and excise taxes is discussed later in the paper.

⁹ These are Progressive Enterprises Limited and Foodstuffs Limited.

¹⁰ See Finkelstein et. al (2013), Sharma et. al (2014), Zhen et. al (2013), Dharmasena and Capps (2012)

¹¹ See Harding and Lovenheim (2014) and Jensen and Smed (2007).

¹² Studies which find the substitution effect is too small to prevent calorie reduction include Harding and Lovenheim (2014), Sharma et. al (2014), Zhen et. al (2013), Finkelstein et. al (2013) and Dharmasena and Capps (2011). Studies which found

There is some evidence which indicates that these substitution effects are less likely with a broad sugar tax (eg, one which applies to all added sugar) than with a narrower tax (eg, one which applies only to SSBs or soft drinks).¹³ However, the reduction in total calories that would result from a sugar tax is still unclear. There is a lack of good-quality empirical economic research on this issue.

Example studies

Finkelstein et. al (2013) used an Almost Ideal Demand System model to estimate that the consumption effects of a 20% SSB tax in the USA. They found that it would reduce net total calorie intake by 4.7%, and only limited substitution effects were detected.

On the other hand, **Fletcher et. al (2010)** investigated the effects of existing US state soft drink taxes using sales data from 1989 to 2006. They found that the taxes had no effect on total calories because of substitution towards other high-calorie beverages, such as full fat milk.

Would a sugar tax reduce obesity levels?

As noted above, it is uncertain whether a tax would reduce overall calorie intake. But even if calorie reductions did result, the effect of the calorie reduction on population weight and obesity is not clear either. Many studies which attempt to estimate the effect of a sugar tax on population weight utilise the popular rule of thumb that a decrease of 3500 calories equals one pound of weight loss (32,220 kJ = 1 kg).¹⁴

However other authors have noted that this rule is probably far too simplistic and may lead to overestimates of how much weight loss will result. Weight loss will not increase indefinitely after a net calorie decrease; instead it will level off at a new equilibrium.¹⁵ In light of this it seems that the 3500-calorie rule is probably inadequate for use in calculating weight loss resulting from a sugar tax.

That limitation notwithstanding, there is evidence that even a small decrease in calorie intake could halt weight gain for the vast majority of the population. This is because most people accumulate only a small amount of energy (less than 50kcal, or 209 kJ) per day.¹⁶ This may mean that a sugar tax could be effective even if the effect on calorie intake is relatively modest.

Example study

Finkelstein et. al (2013) estimated that 4.7% reduction in total calories brought on by a 20% SSB tax in the USA would reduce weight by an average of 0.7 kg per person after one year. They eschewed the 3500-calorie rule in favour of a more dynamic model proposed by Lin et. al (2011).

4. What could a sugar tax look like?

Based on an assessment of the recent economic literature, the evidence on a sugar-tax in New Zealand is not yet clear-cut. However, this section discusses what a tax might look like if one were implemented in New Zealand.

Scope of tax

One key issue is what a tax might apply to. Proposed sugar taxes fall into two categories:

1. **Product-based taxes** apply to certain **categories of products**. The most commonly proposed product-based tax is an SSB tax, which would tax all beverages which contain added sugar. Other proposed taxes are narrower in scope, such as only non-diet soft drinks.
2. **Nutrient-based taxes** apply based on **the amount of a certain nutrient** (in this case sugar) in an item. An example would be a tax on added sugar, which would tax products based on the amount of sugar which has been added to them.

the substitution effect is large enough to prevent any overall calorie reduction include Fletcher et. al (2014) and Fletcher et. al (2010).

¹³ This was found by Harding and Lovenheim (2014).

¹⁴ Dharmasena and Capps (2012) is one study which uses this method.

¹⁵ Martijn Katan and David Ludwig, "Extra Calories Cause Weight Gain But How Much?" accessed via <http://jama.jamanetwork.com/article.aspx?articleid=185134>

¹⁶ Hill et. al, "Obesity and the environment: where do we go from here?", *Science* vol. 299 (2003). 853-855.

Application to New Zealand

The bulk of sugar tax research has been conducted in the USA, but this may not apply perfectly to New Zealand. For example, there is evidence that New Zealanders are more sensitive to price increases on SSBs, possibly because per-capita income in New Zealand is lower than in the USA.²¹ New Zealanders may also substitute in different ways as a result of a tax.

Reformulation

It is unclear how manufacturers might reformulate their products in response to a tax. They may choose to reduce the sugar content of their products in order to limit their tax liability. This would appear to be a positive effect, however it is possible that manufacturers may simply switch to using sugar substitutes which are equally (or more) unhealthy. This occurred in Mexico where the tax caused one soft drink manufacturer to switch from sugar to high-fructose corn syrup, and is a potentially important unintended consequence of a sugar tax.²² This possibility would need to be carefully considered if a sugar tax is used in New Zealand, so that any sugar tax is defined in a way that would incentivise healthier reformulation.

Measurement difficulties

Finally, it may be difficult to measure the success of a sugar tax. **Ministry of Health adult nutrition surveys** would provide a detailed breakdown of sugar and calorie intake, but they are conducted too infrequently to isolate the effect of a tax. **Industry sales figures** would indicate how total consumption changes, but do not show the effect on total calorie intake.

6. Conclusion

Sugar taxes have been proposed as a means of reducing excessive sugar consumption and curbing obesity. However, a review of recent economic literature indicates that the evidence for them is not yet clear-cut. The main issue is whether people will just respond to a tax by switching to other high-calorie items which are untaxed and are cheaper comparatively when the tax is taken into account. There are also a number of questions surrounding implementation.

These issues do not mean that a tax cannot be a good idea. Nevertheless, it seems that more information is required before the effects of a tax can be comprehensively assessed.

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²¹ Cliona Ni Mhurchu et. al, "Food Price and Consumer Demand: Differences Across Income Levels and Ethnic Groups", PLoS ONE 8(10):e75934. DOI: 10.1371/journal.pone.0075394

²² Laura Cornelisen et. al, "Why fat taxes won't make us thin", *Journal of Public Health* 36(2), 2014, accessed via <http://jpubhealth.oxfordjournals.org/content/early/2014/05/21/pubmed.fdu032.long>

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