

Reference: 20160183

29 July 2016



Thank you for your Official Information Act request, received on 1 June 2016. You requested the following:

“Since 16 April 2014 what reports, studies, analysis or briefings, has Treasury produced or been asked by the Government to produce, on taxes or excise duties that could be applied to sugar and fats?”

Information Being Released

Please find enclosed the following documents:

| Item | Date | Document Description | Decision |
|------|-----------|--|-----------------|
| 1. | 29/1/2016 | Draft Treasury intern working paper: An Examination of the Distributional Impact of a “Sugar Tax” in New Zealand | Release in part |
| 2. | 29/1/2016 | Treasury intern presentation: An Examination of the Distributional Impact of a “Sugar Tax” in New Zealand | Release in part |

I have decided to release the documents listed above, subject to information being withheld under one or more of the following sections of the Official Information Act, as applicable:

- names and contact details of junior officials and certain sensitive advice, under section 9(2)(g)(i) – to maintain the effective conduct of public affairs through the free and frank expression of opinions, and
- Section 18(c) – release would violate another statute, or would constitute contempt of Court or contempt of Parliament, namely section 37C of the Statistics Act 1975

It is worth noting that documents 1 and 2 are not Treasury opinion and that document 1 is an incomplete draft. The Treasury internship programme requires interns to produce a report on a topic supplied by the policy team they are assigned to. Alongside a mentor, they undertake their own research and engagements to feed into this report. The reports are high level and are sometimes not finished in the three-month time period they are limited to. Therefore, the reports do not represent a Treasury position and should not be taken as such.

Information Publicly Available

The following information is also covered by your request and is publicly available on the Treasury website:

| Item | Date | Document Description | Website Address |
|------|---------------|--|--|
| 3. | 16/12/2014 | Treasury report: Options for Regulatory Responses to the Growing Obesity Problem | www.treasury.govt.nz/downloads/pdfs/oia/oia-20150441.pdf |
| 4. | February 2015 | Draft Treasury intern working paper: A Conceptual Basis and Evidence Base for Health Tax | www.treasury.govt.nz/downloads/pdfs/oia/oia-20150441.pdf |

Accordingly, I have refused your request for the documents listed in the above table under section 18(d) of the Official Information Act – the information requested is or will soon be publicly available.

Information to be Withheld

There are additional documents covered by your request that I have decided to withhold in full under the following sections of the Official Information Act, as applicable:

- Section 18(c) – release would violate another statute, or would constitute contempt of Court or contempt of Parliament, namely section 37C of the Statistics Act 1975.

Section 37C of the Statistics Act 1975 provides data access to researchers under strict conditions which limit the sharing of information – such as that contained in these documents – which may reveal confidential information regarding specific individuals or organisations.

In making my decision, I have considered the public interest considerations in section 9(1) of the Official Information Act.

Please note that this letter (with your personal details removed) and enclosed documents may be published on the Treasury website.

This fully covers the information you requested.

You have the right to ask the Ombudsman to investigate and review my decision.

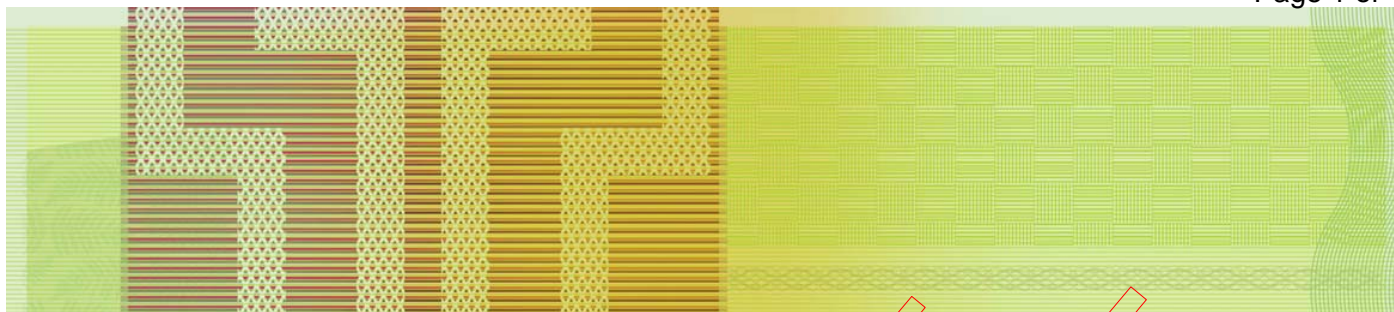
Yours sincerely

Eina Wong
Acting Team Leader, Tax Strategy

TOIA 20160183

Information for release

| | | |
|----|---|----|
| 1. | An Examination of the Distributional Impact of a “Sugar Tax” in New Zealand | 1 |
| 2. | Draft intern sugar tax presentation | 30 |



An Examination of the Distributional Impact of a “Sugar Tax” in New Zealand

s9(2)(g)(i)

New Zealand Treasury Working Paper

February 2016



New Zealand Government

DISCLAIMER

The views, opinions, findings, and conclusions or recommendations expressed in this Working Paper are strictly those of the author(s). They do not necessarily reflect the views of the New Zealand Treasury or the New Zealand Government. The New Zealand Treasury and the New Zealand Government take no responsibility for any errors or omissions in, or for the correctness of, the information contained in these working papers. The paper is presented not as policy, but with a view to inform and stimulate wider debate.

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

**NZ TREASURY WORKING
PAPER 15/##**

An Examination of the Distributional Impact of a "Sugar Tax"

MONTH/YEAR

February 2016

AUTHOR/S

s9(2)(g)(i)
Treasury
No. 1 The Terrace
Wellington
New Zealand

Email s9(2)(g)(i)

Telephone s9(2)(g)(i)

...

[Work place
Postal address
City
Country]

Email [Email address]

Telephone [Country code – Area code - telephone number]

Fax [Country code – Area code - fax number]

ISBN (ONLINE)

URL

Treasury website at Month 2015:
<http://www.treasury.govt.nz/publications/research-policy/wp/2015/>
Persistent URL: <http://purl.oclc.org/nzt/>

ACKNOWLEDGEMENTS

[optional] John Creedy, Suzy Morrissey, Steve Mack, Kristie Carter,
John Marney, IRD?

NZ TREASURY

New Zealand Treasury
PO Box 3724
Wellington 6008
NEW ZEALAND
Email information@treasury.govt.nz
Telephone 64-4-472 2733
Website www.treasury.govt.nz

OFFICIAL INFORMATION ACT

Abstract

[Abstract]

JEL CLASSIFICATION

[insert one per line]

KEYWORDS

[insert each one – separated by a semi colon]

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

Executive Summary

Excess consumption of sugary products, especially sugar-sweetened beverages (SSBs), is a major contributor to New Zealand's high rate of obesity, as well as causing a range of other health problems. Taxing unhealthy products and incentivising their substitution with healthier alternatives has been used by several countries in an attempt to reduce obesity rates.

However, empirical analysis of New Zealand expenditure data has confirmed international evidence that such a tax would be regressive. Furthermore, low-income consumers have a lower elasticity of demand for SSBs, which may accentuate the regressivity of the tax and reduce the effectiveness of the tax in changing consumption behaviour. Another concern is the potential for consumers to substitute unhealthy but non-taxed products for SSBs, leading to negligible health improvements.

My project explores some of the challenges associated with sugar taxes as a policy instrument for reducing obesity.

RELEASED UNDER THE OFFICIAL INFORMATION ACT

Table of Contents

| | |
|--|------------|
| Abstract | i |
| Executive Summary | ii |
| Table of Contents | iii |
| List of Tables | iii |
| List of Figures | iv |
| 1 Introduction | 1 |
| 2 Background to sugar taxes | 2 |
| 2.1 Theoretical basis | 2 |
| 2.2 History..... | 2 |
| 2.3 Scope..... | 2 |
| 2.4 Rationale for targeting SSBs..... | 3 |
| 2.5 Indirect costs..... | 3 |
| 2.6 Intervention logic..... | 3 |
| 3 Literature review | 4 |
| 3.1 Share of calorie consumption from SSBs | 5 |
| 3.2 Summary of literature on SSB elasticities..... | 7 |
| 3.3 Review of effectiveness of sugar taxes | 10 |
| 4 Distributional effects of a sugar tax | 12 |
| 4.1 Method of analysis | 12 |
| 4.2 Budget shares | 13 |
| 5 [John to complete] | 17 |
| 5.1 Modelled own-price elasticities | 17 |
| 5.2 Estimated reduction in calorie consumption | 17 |
| 5.3 Estimated reduction in weight and obesity | 17 |
| 6 Conclusions | 18 |
| References | 19 |
| Appendix | 23 |

List of Tables

| | |
|---|----|
| Table 1 – Share of total calorie consumption from SSBs..... | 5 |
| Table 2 – Summary of own-price elasticities for soft drinks | 8 |
| Table 3 – Summary of literature on cross-price elasticities between soft drinks and related products..... | 9 |
| Table 4 – Summary of literature on effectiveness of sugar taxes | 10 |
| Appendix Table 1 – Expenditure proportions for all households | 23 |
| Appendix Table 2 – Expenditure proportions for two or more adults without children | 24 |
| Appendix Table 3 – Expenditure proportions for two or more adults with children | 25 |
| Appendix Table 4 – Expenditure proportions for single adult households..... | 26 |
| Appendix Table 5 – Expenditure proportions for Asians | 26 |
| Appendix Table 6 – Expenditure proportions for Europeans..... | 27 |
| Appendix Table 7 – Expenditure proportions for Maori | 27 |
| Appendix Table 8 – Expenditure proportions for Pasifika | 28 |

List of Figures

| | |
|--|----|
| Figure 1 – Weighted average expenditure proportion for all households | 13 |
| Figure 2 – Weighted average expenditure proportion for two or more adults without children | 13 |
| Figure 3 – Weighted average expenditure proportion for two or more adults with children | 14 |
| Figure 4 – Weighted average expenditure proportion for single adult households | 15 |
| Figure 5 – Weighted average expenditure proportion for Asian households | 15 |
| Figure 6 – Weighted average expenditure proportion for European households..... | 16 |
| Figure 7 – Weighted average expenditure proportion for Maori households | 16 |
| Figure 8 – Weighted average expenditure proportion for Pasifika households..... | 17 |

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

An Examination of the Distributional Impact of a “Sugar Tax” in New Zealand

1 Introduction

The social costs of obesity are well-established and represent a significant current and future fiscal risk to the healthcare budget. A primary cause is the overconsumption of high-calorie food and drink, especially sugar-sweetened beverages (SSBs). Many countries have implemented health-related taxes – a “fat tax” or “sugar tax” – to incentivise their replacement in the diet by healthier substitutes, which in theory would reduce the calorific intake of the average consumer and ultimately decrease the prevalence of obesity. Given New Zealand’s high rate of obesity, there have been calls for a similar tax to be introduced in this country. However, there is considerable uncertainty regarding the effects of these taxes and a comprehensive evaluation of their impact on obesity rates yields mixed results.

Empirical analysis of New Zealand data confirms the existing evidence that a “sugar tax” is likely to be regressive. Low-income consumers spend a higher proportion of their income on the targeted food groups and so bear a relatively higher burden of the tax. However, an argument advanced in favour of the tax is that the health gains are likely to be progressive, with the largest reductions in obesity rates occurring among lower-income households. Analogies are drawn with alcohol and tobacco taxes, which are both regressive. There evidence is mixed on this point, and furthermore, low-income consumers have less elastic demand for SSBs, which may accentuate the regressivity of the tax and reduce the effectiveness of the tax in changing consumption behaviour.

This paper seeks to model the distributional effects of a “sugar tax” to inform debate on this policy instrument as a tool for reducing the social costs of excess sugar consumption.

2 Background to sugar taxes

2.1 Theoretical basis

The theoretical basis for a sugar tax is that overconsumption of high-sugar products is a market failure which imposes negative externalities on society through increased health costs and higher rates of premature death from a range of non-communicable diseases. Conceptually, a sugar tax could be considered an extension of existing sin taxes applied to alcohol and tobacco. While sin taxes often generate sizeable revenue, their primary goal is to improve health and social outcomes and internalise the externalities created by consumption of demerit goods (Ashton & St John, 1985).

Individuals often consume excess quantities of demerit goods due to problems of incomplete information, hyperbolic discounting and behavioural biases (Gucake, 2015). While mandatory food labelling provides consumers with the sugar and energy content of the product, awareness of the long-term effects of diet on health – especially the relationship between consumption of SSBs and diseases such as type 2 diabetes – is less common. Hyperbolic discounting occurs when people discount the future heavily and prioritise short-term pleasure over long-term health, leading them to make irrational consumption decisions which are not in their best interest (Ackerley, 2007).

2.2 History

Many countries have imposed excise taxes on imported sugar and soft drinks since the early 20th century, including New Zealand from 1932 to 1971, as well as Ireland, Norway, Finland and Denmark (Ashton & St John, 1985; OECD, 2015). However, original excise taxes were designed primarily for revenue generation as they were set at a rate too low to induce a shift in consumption (Shadbolt, 2015). The first health-related taxes specifically designed to discourage consumption of unhealthy foods were introduced by Denmark and Hungary in 2011 (OECD, 2015). Nevertheless, many excise taxes have recently been “re-labelled” as health taxes as the adverse effects of unhealthy diets have become more prevalent (Shadbolt, 2015; OECD, 2015).

2.3 Scope

The most common type of sugary product taxed is SSBs. As at January 2016, nine countries impose a sugar tax at the national level, all of which include SSBs in their scope. These include six OECD nations: Australia, Finland, France, Hungary, Norway and Mexico, as well as four Pacific Island states or territories: Fiji, French Polynesia, Nauru and Samoa (Mytton and Rayner). In addition, 23 US states impose an SSB tax (Mytton and Rayner). Other sugary products taxed include chocolate, ice cream and confectionary (OECD, 2015). Denmark abolished their tax on SSBs in 2014 in an effort to increase the competitiveness of Danish firms and recoup jobs lost to neighbouring countries (Scott-Thomas, 2013).

2.4 Rationale for targeting SSBs

The high sugar content of SSBs, as well as their properties of low satiation and high addictiveness are often cited as reasons for targeting SSBs. A typical 375mL can of soft drink contains 40g of sugar, 33% higher than the total daily recommended sugar intake for an adult (NHS, 2014). This is accentuated by the fact that high quantities of soft drink can be consumed before the consumer is satiated, meaning that sugar consumption through drinks can occur at a higher rate than solid foods (Bray, 2004). Furthermore, sugar consumption releases dopamine, a chemical which releases a pleasurable feeling, into the brain, which encourages addiction (Lustig, Schmidt & Brindis, 2013) **[NB addiction suggests inelastic demand]**

The weight of epidemiological and experimental evidence indicates that higher intake of SSBs is associated with greater weight gain and obesity (Hu and Malik, 2010). Basu et al (2013) found that a 1% rise in soft drink consumption was associated with a 7.1% rise in overweight or obese adults in the population. Furthermore, the risk of becoming obese increases by 60% for each additional serving of SSB per day consumed (Brownell et al, 2009). The evidence also supports a link between SSB consumption and a range of other adverse health outcomes such as stroke, cancer, impaired cognitive development, cardiovascular disease, type two diabetes, raised blood pressure, dyslipidaemia, gout and dental caries (NZBGP, 2014).

2.5 Indirect costs

Obesity and its associated diseases will be the main focus of this report due to the high rate of obesity in New Zealand and its sizeable cost to the health system. Boyd and Swinburne (2012) estimated the cost of obesity-related illnesses amounted to \$624 million or 4.4% of New Zealand's healthcare expenditure, with \$247 million attributed to type 2 diabetes (Ministry of Health, 2009). New Zealand has the third-highest rate of obesity in the OECD; 31% of New Zealand adults are obese and an additional 35% are overweight (Sassi, 2010). Obesity rates have risen 20% in the last 30 years (Ministry of Health, 2015).

There is a strong relationship between SSB consumption and obesity. [connection between SSB consumption and obesity]

However, large disparities exist between ethnic and socio-economic groups: 66% of Pacific and 47% of Maori adults are obese, compared to 12% of Asian and 29% of European New Zealanders (MoH, 2015). Obesity is also positively correlated with socio-economic deprivation – being 72% higher among lower socio-economic groups as the least deprived communities (MoH, 2015). Furthermore 32% of New Zealand children have an unhealthily high weight, which represents a significant future risk for health expenditure (Carter, 2014).

2.6 Intervention logic

A detailed analysis of the causes of obesity is beyond the scope of this paper, however the two primary causes of unhealthy weight gain are an excessive nutrient intake through

consumption of fatty and sugary food and drink combined with low nutrient intake via lack of exercise (Ministry of Health, 2015). A “sugar tax” attempts to combat the former of these two causes. By increasing the price of unhealthy food, a sugar tax disincentivises its consumption and encourages replacement with healthier substitutes. In the case of SSBs, water is a healthy substitute that is available to virtually all New Zealand households at low cost. The intention is that this would reduce the calorie intake of consumers of SSBs, leading to a reduction in their weight. As consumers of SSBs are more likely to be overweight or obese, this is well targeted on this segment of the population. A healthier weight reduces the risk of contracting any of the diseases associated with obesity. Ultimately, this is intended to decrease the number of deaths caused by obesity.

This intervention logic is summarised in the following flow diagram:

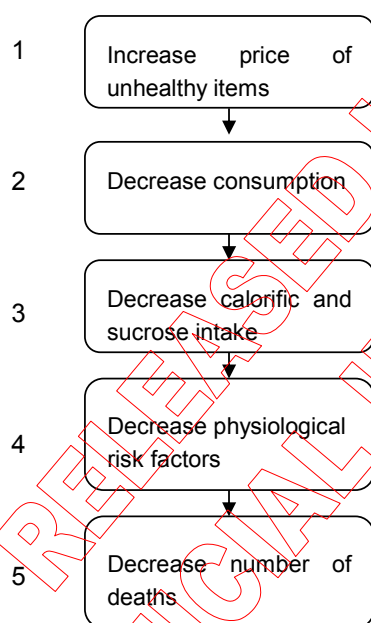


Figure 1: Intervention logic for sugar tax (Nnoaham et al, 2009)

While the logic between steps 2 to 5 is sound, this report will focus primarily on evaluating the relationship between steps 1 and 2 due to mixed evidence on the effectiveness of a sugar tax on reducing consumption of high-sugar products. The extent to which consumption decreases depends on a range of factors including the rate of the tax, the own-price elasticity of the product and cross-price elasticities with substitute and complement goods.

3 Literature review

A review of the available literature on four key areas was conducted: the share of total energy consumption from SSBs, the relationship between income (and other household characteristics) and obesity, the elasticities of sugary products and the effectiveness of sugar taxes. A range of academic databases, including Google Scholar, Science Direct

and Elsevier as well as the internal Treasury database were searched in undertaking this analysis.

3.1 Share of calorie consumption from SSBs

While SSBs are the most common sugary product taxed overseas, to determine whether a tax on SSBs would be appropriately targeted in New Zealand it is necessary to examine whether SSBs are a significant contributor to energy consumption. A review of the available literature on SSB consumption was conducted across a range of sources, including the Ministry of Health and New Zealand Beverage Guidance Panel. While the Ministry of Health data is likely to be the most accurate source for modelling the effect of a tax in New Zealand, its limitation is the lack of distinction between types of non-alcoholic beverage. The data from the New Zealand Beverage Guidance Panel provides information on the proportion of sugar that is consumed from SSBs, but makes no mention of the proportion of total energy consumption that this represents. US epidemiological studies provide a more detailed analysis of the share of total energy consumption from SSBs, but these reflect American consumption patterns which may differ from those of New Zealanders. Evidently, there is no one ideal source, so a reasonable estimate of sugar and energy consumption must be obtained from pooling this data. The data are summarised in Table 1.

When the proportions are expressed as a percentage of total energy consumption the tax appears poorly targeted, as non-alcoholic beverages make up 5% of total calories consumed by the average New Zealander, and is only the fifth-highest contributor to total energy intake (Ministry of Health, 2015). However, SSBs constitute 17% of all sugar consumption and non-alcoholic beverages are the second highest contributor to total sugar intake, higher than sweets but below fruit (NZ Beverage Guidance Panel, 2015). Attention ought to be paid to the sugar intake, as excess sugar consumption may to many other detrimental health symptoms such as dental caries.

According to the NZ Beverage Guidance Panel, children obtain a higher proportion of their daily sugar intake from SSBs than adults, at 26%. This is significantly higher than the 10-15% reported by Wang et al (2008) in a US sample.

Table 1 – Share of total calorie consumption from SSBs

| Study | Proportion of total energy consumed | Proportion of total sugar consumed | Category | Population group | Country |
|-----------------------------------|--|------------------------------------|--|--------------------------|---------|
| Ministry of Health (2009) | 5% (range: 2.2-10%) 4.2% | - | Non alcoholic beverages and Sugar and sweets | Total population | NZ |
| Ruff & Zhen (2015) | 22663 kcal/year | - | All beverages | Total population | US |
| Bray et al (2004) | 16% | - | Added calorific sweeteners | Total population | US |
| Bleich et al (2009) | 231-289kcal/ day 63-83kcal/day =3-13% (assuming 2,100 average daily cal consumption) | - | SSBs | Total population | US |
| Duffey et al (2007) | 21% | - | All beverages | Total population | US |
| NZ Beverage Guidance Panel (2014) | - | 17% 26% | SSBs | Adults Children | NZ |
| Wang et al (2008) | 10-15% 204-224kcal/day | - | SSBs (inc fruit juice) | Children and adolescents | US |

3.1.1 Relationship between income and SSB consumption

Data from the Ministry of Health’s New Zealand Adult Nutrition Survey indicates that while non-alcoholic beverage intake does not vary significantly with socio-economic status, there is a positive correlation between the frequency of soft drink consumption and the level of neighbourhood deprivation (Ministry of Health, 2010).

[Obesity rates are significantly higher among New Zealanders living in socioeconomically deprived areas. In particular, children living in the most deprived areas are three times as likely to be obese as children living in the least deprived areas. This finding is not explained by differences in the sex, age or ethnic composition of the child population across areas of high and low deprivation.] (Ministry of Health, 2012) [implication]

A US study (Lin & Smith), reinforces this conclusion, finding that on average, low-income adults consumed 4.8 oz more sugary drinks per day, equivalent to an additional 61 calories, than high-income adults (Lin & Smith). However, they also found that diet drink consumption increases with income.

Lin & Smith: low-income adults consumed more SSBs than high income adults by 61 calories

MoH (2009): Positive correlation between frequency of soft drink consumption and level of neighbourhood deprivation.

MoH (2006): body mass index (BMI) and waist circumference (WC) distributions were strongly associated with socioeconomic position whether measured at the individual, household or neighbourhood level. The inverse gradient increased at higher BMI or WC percentiles. However, segmentation into different population groups reveals a more nuanced picture - Non-Māori females showed a strong inverse socioeconomic gradient for BMI and WC, non-Māori males a much shallower inverse gradient, Māori females little if any relationship, and Māori males a moderately strong positive correlation (ie, among Māori males, higher SEP was associated with larger BMI or WC).

Utter et al (2010): A positive association between BMI and socioeconomic deprivation was observed for Pacific students, Māori students and European students, but not for Asian students and students of other ethnicities.

Utter et al (2007): Higher prevalences of obesity were observed among children experiencing socioeconomic deprivation.

TBC

3.1.2 Other factors associated with SSB consumption

The share of total sucrose intake from non-alcoholic drinks is significantly higher for Maori and Pasifika individuals (22.3% and 22.4% respectively) compared to those of the New Zealand European ethnic group (16.1%), and especially high among Maori and Pasifika teenagers (33.6% and 32.1%, respectively).

Figures for total energy were similarly higher among Maori and Pasifika than Europeans, with Maori and Pasifika attaining 6.4% and 6.1%, respectively, of their total energy intake from non-alcoholic drinks. Young Maori and young Pasifika 8.7% and 8.1%

Regressivity effects

Leicester & Windmeijer (2004): estimates that "very poorest" 2% spend about 0.7% of their total income on the tax.

3.2 Summary of literature on SSB elasticities

Some studies, such as Powell et al (2012) and Escobar et al (2013) were meta-analyses of other studies, whereas others empirically derived the own-price and cross-price elasticities from a demand system (Lin and Smith; Sharma et al, 2014). Two studies separated consumers into high and low-income groups, taking account of the differing price sensitivities of consumers with different incomes (Finklestein et al, 2010 and Lin & Smith). Three studies also distinguished between regular and diet drinks (Andreyeva et al, 2010; Lin & Smith; and Sharma et al, 2014).

Information on the own-price elasticity of demand of soft drinks is necessary but not sufficient to determine whether a sugar tax will be effective in reducing obesity rates.

Cross-price elasticities are needed to assess the degree of substitution with non-taxable products that is likely to occur in the event of a price increase. Furthermore, while price elasticities indicate the sensitivity of the average consumer to a price change, they do not reflect the consumption patterns of those consumers who are obese or at risk of becoming obese, which are the intended target demographics for this policy. No studies focused specifically on these target groups.

Tables 2 and 3, respectively, provide a summary of the literature on own-price and cross-price elasticities of demand for SSBs.

3.2.1 Own-price elasticities

Table 2 – Summary of own-price elasticities for soft drinks

| Study | Own price elasticities | | |
|--------------------------|---|-------------------------------|------------------------------|
| | Average | High income | Low income |
| Andreyeva et al (2010) | All SSBs: -0.9 (range: -0.8 to -1.0) Regular: -1.05 Diet/low calorie: -1.26 [Sweets and sugars: -0.34] | N/A | N/A |
| Escobar et al (2013) | -1.299 | N/A | N/A |
| Finklestein et al (2010) | -0.73 | -1.02 ¹ | -0.49 ² |
| Lin & Smith (2010) | N/A | Regular: -1.29 Diet: -0.46 | Regular: -0.95 Diet: -0.7 |
| Powell et al (2013) | -0.86 | N/A | N/A |
| Sharma et al (2014) | Regular: -0.63 Diet: -1.01 | N/A | N/A |
| Miao et al (2013) | -0.95 | N/A | N/A |

Across all studies surveyed, own-price elasticities for all SSBs range between -0.63 and -1.30. The average of the seven studies is -0.9, or mildly inelastic, which corresponds with the figure obtained from the meta-analysis conducted by Andreyeva et al (2010). Consistent with the economic theory that narrower categories of products have more elastic demand, Andreyeva et al (2010) noted that separating all SSBs into regular and diet varieties yields higher values for both than combining them into one group. Powell et al (2013) found that if the tax is applied to both regular and artificially sweetened soft

¹ for 50 to 75% income quartile

² for 0 to 25% income quartile

drinks, consumers will reduce overall soft drink demand to lesser extent than demand for regular soft drinks would reduce with a tax on regular only. [implication] Consumption away from home more elastic (Andreyeva et al, 2010)

3.2.2 Cross-price elasticities

Table 3 – Summary of literature on cross-price elasticities between soft drinks and related products

| Study | Cross-price elasticity | |
|----------------------|--|--|
| Lin & Smith (2010) | Low income: Diet drinks: -0.695 Skim milk: -0.367 Low fat milk: -0.820 Whole milk: -0.631 Juices: -1.017 Coffee/tea: -0.802 Bottled water: -0.718 | High income: Diet drinks: -0.464 Skim milk: -0.883 Low fat milk: -0.383 Whole milk: -0.804 Juices: -0.928 Coffee/tea: -0.331 Bottled water: -0.832 |
| Escobar et al (2013) | Fruit juice: 0.388 Whole milk 0.129 Diet soft drinks -0.423 | |
| Sharma et al (2014) | Diet soft drinks: 0.16 Cordial: -0.51 Bottled water: 0.37 Fruit drink: -0.62 Fruit juice: 0.18 High fat milk: 0.46 Low fat milk: 0.12 Tea: -0.89 Coffee: -0.89 | |

According to Escobar et al (2013), fruit juices and possibly whole milk act as substitutes for SSBs. However, diet drinks are a complement.

Lin & Smith: also suggests that sugary drinks & diet drinks are complements but would expect taxing one would induce a substitution effect to the other. Perhaps suggesting tax would change social norms, making drinking sugary drinks less socially desirable, having spillover effect from regular into diet drinks. But no mention in study.

3.3 Review of effectiveness of sugar taxes

While the majority of studies support the conclusion that sugar taxes have a measurable impact on consumption, the evidence is mixed on whether the reduction in consumption results in a reduction in weight and obesity rates.

Sharma et al (2014): progressive health gains

TBC; Limited data available

Literature points to the conclusion that an SSB tax would be well-targeted on the young poor and most at risk of being overweight (Mytton et al)

Table 4 – Summary of literature on effectiveness of sugar taxes

| Study | Effectiveness | Tax rate | Reduction in consumption | Reduction in weight/obesity |
|---------------------------|---|----------|--------------------------|---|
| Alemanno & Carreno (2011) | Analogies with tobacco and alcohol taxes: heavy users are less price sensitive. Need to use as part of a policy package to be effective. | TBC | | |
| Brownell et al (2009) | Sugar taxes can have a strong positive effect on reducing consumption | | | |
| Chouinard et al (2005) | May successfully reduce consumption but health gains minimal | | | |
| Escobar et al (2013) | May benefit health and lead to a modest weight reduction Should be part of a policy package | | | |
| Finklestein et al (2010) | | 20% | 24.3 kcal/day/person | 1.6 lbs in first year Cumulated 2.9 lbs in total |
| Lin & Smith (2010) | Consumption would be reduced and this would translate into weight reductions | | | |
| Moodie et al | A high tax rate (>20%) could influence dietary intake and health outcomes but not definitive | | | |
| Mytton et al | Higher taxes likely to have more impact. Effects greatest for young, poor | | | |

| | | | | |
|---------------|---|---|--|--|
| | and those most at risk of being overweight | | | |
| Nnoaham et al | Positive health effects, but not necessarily greater for low-income groups. | | | |
| OECD | Effective in reducing consumption and if sufficiently high can lead to positive health outcomes | | | |
| Sharma et al | | 20% valoric tax 20c/L volumetric tax | | |
| | | | | |
| | | | | |

RELEASED UNDER THE OFFICIAL INFORMATION ACT

4 Distributional effects of a sugar tax

4.1 Method of analysis

To consider the impact of the tax on New Zealand households with different demographic characteristics, a dataset was constructed using household expenditure data from the Household Economic Survey (HES), a nationally representative survey of approximately 3,000 New Zealand households, for the years 2007, 2010 and 2013. Expenditure in the HES is classified to a fine level of detail, enabling a robust analysis of the implications of taxing different food groups. Data from these three surveys were pooled and the expenditure converted to 2013 dollars using the Consumer Price Index (CPI). Consumers were divided into twenty groups based on their total annual household expenditure; from \$0 to \$100,000 in increments of \$10,000, and from \$100,000 to \$400,000 in increments of \$50,000.

Two scenarios were evaluated: a tax on SSBs only and a more comprehensive sugar tax encompassing SSBs and other sugary foods. To do this, the proportion of each household's total expenditure ("budget share ratio") on each of three commodity groups were calculated: category 1 being all soft drinks (SSBs), category 2 containing other clearly defined food groups which are high in sugar (chocolate, ice cream, cakes and biscuits, confectionary, desserts as well as sugar itself and variants thereof), and category 3 containing all other goods. Goods such as tomato sauce and jam, while high in sugar, were not included in any scenario due to the lack of international precedent on including these products in a sugar tax.

A weighted average of budget shares on each of these three categories for each total expenditure group was calculated. The household type and ethnicity variables were incorporated into the model and output tables produced for:

- 1) All households
- 2) Households with two or more adults
- 3) Single adult households
- 4) Households where the head of the household is Asian
- 5) Households where the head of the household is European
- 6) Households where the head of the household is Maori
- 7) Households where the head of the household is Pasifika

An average of own-price elasticities from the literature for different income groups was used to model the sensitivity of the demand of targeted products to a price increase. Cross-price elasticities were also used to take account of demand substitution with other sugary products.

4.2 Budget shares

The empirical analysis confirms the expected result that for most population groups there is a negative correlation between total household expenditure and expenditure on the targeted products. Since expenditure is positively correlated with income, this provides evidence of the regressivity of the tax. The budget shares for various household types and both categories of sugary product (SSBs only and all other sugary products) are illustrated in figures 1 to 8.

4.2.1 All households

For the entire sample, a tax on SSBs shows mildly regressive effects, and a tax on all sugary products is moderately regressive, as shown in Figure 1.

Figure 1 – Weighted average expenditure proportion for all households

s18(c) The Statistics Act s37



4.2.2 By household type

Budget shares for households with two or more adults but no children correspond very closely to the total population, except for low-income households in this category which is a moderately higher proportion than all households. This is shown in Figure 2.

Figure 2 – Weighted average expenditure proportion for two or more adults without children

s18(c) The Statistics Act s37

A large rectangular area of the page is redacted with a solid grey fill. The text 's18(c) The Statistics Act s37' is visible in the top-left corner of this redacted area.

Children increase average SSB consumption among lower-income households, but it appears that they have negligible effect on expenditure proportions among higher-income groups.

Figure 3 – Weighted average expenditure proportion for two or more adults with children

s18(c) The Statistics Act s37

A large rectangular area of the page is redacted with a solid grey fill. The text 's18(c) The Statistics Act s37' is visible in the top-left corner of this redacted area.

Single adult households spend a lower proportion of total expenditure on sugary products than average, as shown in Figure 4.

Figure 4 – Weighted average expenditure proportion for single adult households

s18(c) The Statistics Act s37



4.2.3 By ethnicity

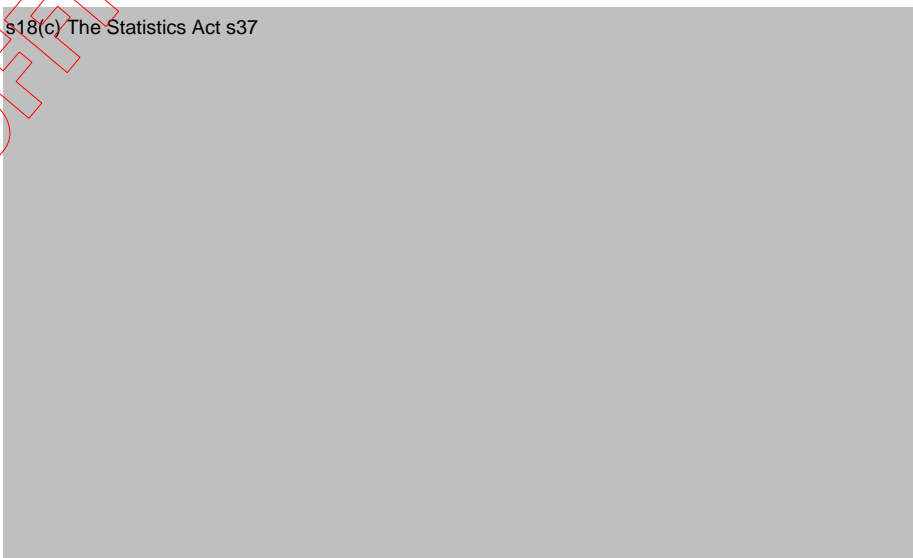
Maori and Pasifika consume SSBs at higher rates than Europeans and Asians (Ministry of Health, 2010). Maori and Pasifika have lower incomes on average than Europeans and Asians (Stats NZ) Maori and Pasifika have higher rates of obesity than Europeans and Asians (MoH) Ergo, we would expect Maori and Pasifika to spend a greater proportion of their income on sugary products, and this is confirmed by HES data.

Figures 5 to 8 illustrates the budget shares for Asian, European, Maori, and Pasifika households respectively.

Budget shares for sugary products and SSBs are lower among Asians than the general population and this proportion does not vary significantly with total expenditure.

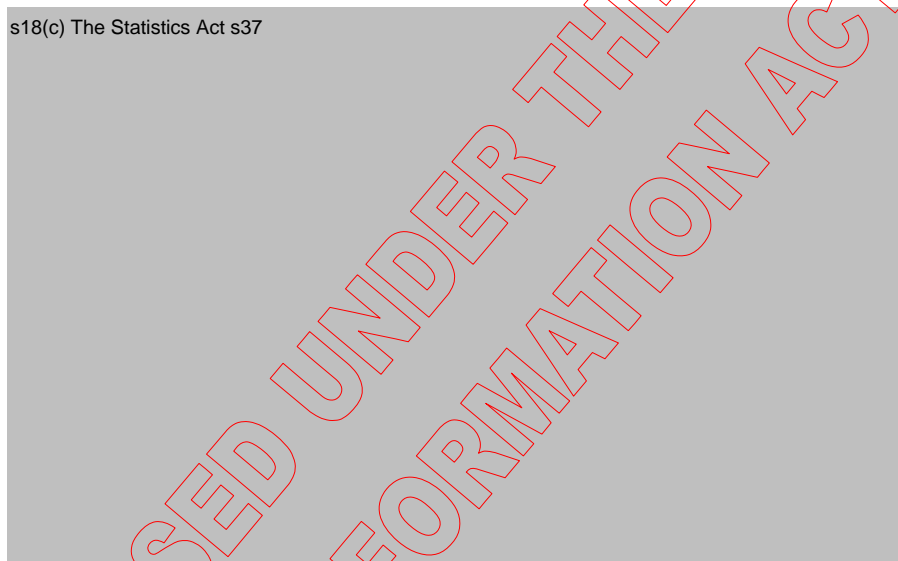
Figure 5 – Weighted average expenditure proportion for Asian households

s18(c) The Statistics Act s37



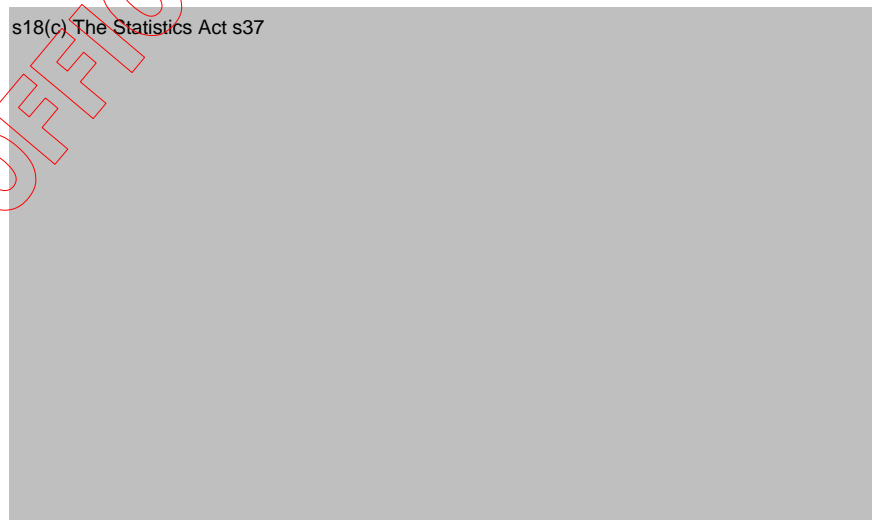
The consumption pattern for European New Zealanders closely matches that of the total population, which is expected given that 74% of New Zealand's population falls into this category (Statistics New Zealand, 2013).

Figure 6 – Weighted average expenditure proportion for European households



Budget shares for Maori are the opposite of the result obtained for the total population. Higher-income Maori spend a greater proportion of their income on SSBs (albeit a slightly lower proportion of other sugary products), than lower-income Maori. Therefore, an SSB tax is likely to have a progressive incidence on Maori. However, the small sample size of 873 households reduces the validity of this conclusion.

Figure 7 – Weighted average expenditure proportion for Maori households



Budget shares for Pasifika are higher than the total population for both categories of product. The high variability reflects the small sample size of Pasifika households in the HES.

Figure 8 – Weighted average expenditure proportion for Pasifika households

s18(c) The Statistics Act s37



5 [John to complete]

5.1 Modelled own-price elasticities

TBC

5.2 Estimated reduction in calorie consumption

TBC

The next stage of the analysis involved estimating the reduction in calorie consumption from a tax, to determine the effect on weight and obesity rates. To do this, data on the proportion of average daily energy intake obtained from SSBs were calculated, adjusted for age and income. A reduction in energy consumption of 1kCal can be approximated to a loss of 0.13 kg of body fat, therefore a reduction in weight and obesity rates can be subsequently estimated (Calorie converter.com)

5.3 Estimated reduction in weight and obesity

TBC

6 Conclusions

TBC

Regressive nature of sugar tax

Elasticities

Weight and obesity reductions, likely effectiveness in a NZ context

Alternative policy instruments – education, regulation on marketing or sugar content

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

References

- Alemanno, A., & Carreño, I. (4/2011). Fat taxes in the EU between fiscal austerity and the fight against obesity. *European Journal of Risk Regulation*.
- Andreyeva, T., Long, M. W., & Brownell, K. D. (2010). The Impact of Food Prices on Consumption: A Systematic Review of Research on the Price Elasticity of Demand for Food. *American Journal of Public Health*, 100(2), 216-222.
- Ashton, T., & John, S. S. (1985). *Insights into Excises, A Focus on Alcohol, Tobacco and Motor Fuels Taxation*. Victoria University Press for the Institute of Policy Studies.
- Australian Government Preventative Health Taskforce. (2009). *Australia: the healthiest country by 2020*. Australian Government.
- Ball, C., Creedy, J., & Ryan, M. (2014). *Food Expenditure and GST in New Zealand*. New Zealand Treasury Working Paper 14/07.
- Basu, S., McKee, M., Galea, G., & Stuckler, D. (2013). Relationship of Soft Drink Consumption to Global Overweight, Obesity, and Diabetes: A Cross-National Analysis of 75 Countries. *American Journal of Public Health*, 2071-2077.
- Bray, G. A., Nielsen, S. J., & Popkin, B. M. (2004). Consumption of high-fructose corn syrup in beverages may play a role in the epidemic of obesity. *American Journal of Clinical Nutrition*, 537-543.
- Brownell, K., Farley, T., al. W. C., Popkin, B. M., Chaloupka, F. J., Thompson, J. W., et al. (2009). *The Public Health and Economic Benefits of Taxing Sugar-Sweetened Beverages*.
- Carter, H. (2014). *Regulatory responses to address the growing obesity problem in New Zealand*. New Zealand Treasury intern research report.
- Cash, S. B., Sunding, D. L., & Zilberman, D. (2005). Fat taxes and thin subsidies: Prices, diet, and health outcomes. *Acta Agriculturae Scandinavica Section C*, 167-174.
- Coloma, G. (2009). Estimation of demand systems based on elasticities of substitution. *Review of applied economics*, 5(1-2), 31-48.
- Cutler, D. M., Glaeser, E. L., & Shapiro, J. M. (2003). Why Have Americans Become More Obese? *Journal of Economic Perspectives*, 17(3), 93-118.
- Daniel, C. (2016 (forthcoming)). Economic constraints on taste formation and the true cost of healthy eating. *Social Science & Medicine*, 31-41.
- Development, O. f. (2015). *Roundtable on health-related taxes on food and non-alcoholic beverages in OECD countries: background note*. Paris: OECD.
- Duffey, K. J. (2007). Shifts in patterns and consumption of beverages between 1965 and 2002. *Obesity*, 2739-2747.

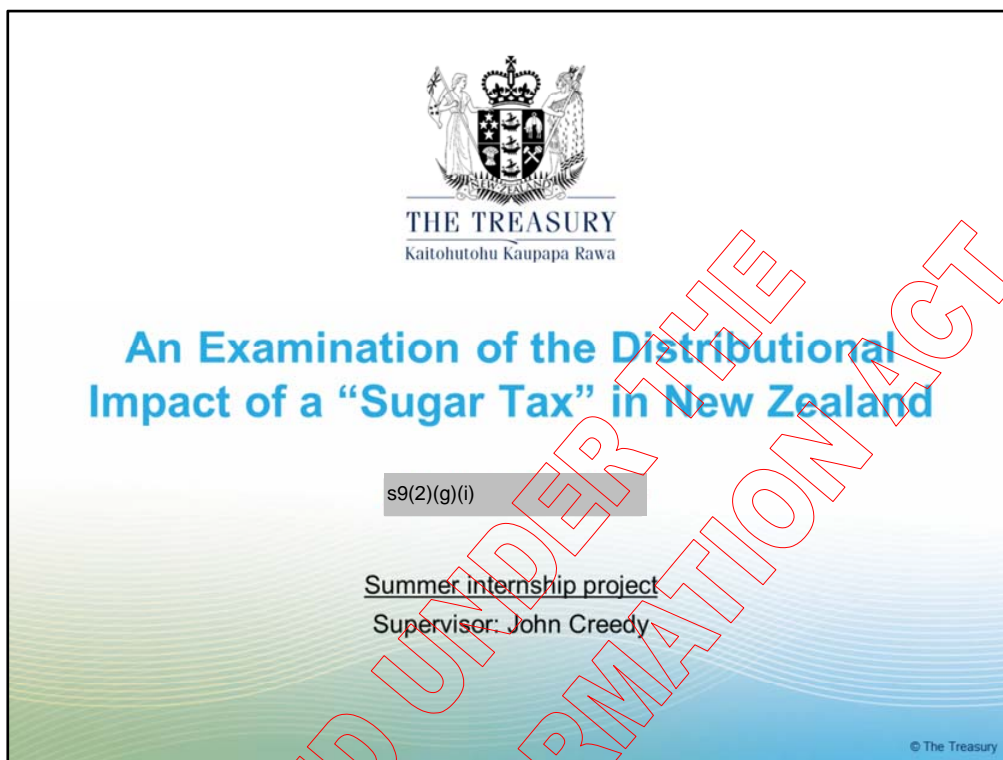
- Escobar, M. A., Veerman, J. L., Tollman, S. M., Bertram, M. Y., & Hofman, K. J. (2013). Evidence that a tax on sugar sweetened beverages reduces the obesity rate: a meta-analysis. *BMC Public Health* , 13 (1072).
- Eyles, H., Mhurchu, C., Nghiem, N., & Blakely, T. (2012). Food pricing strategies, population diets, and non-communicable disease: a systematic review of simulation studies.
- Finkelstein, E. A., Zhen, C., Nonnemaker, J., & Todd, J. E. (2010). Impact of Targeted Beverage Taxes on Higher- and Lower-Income Households. *Health Care Reform* .
- Fletcher, Frisvold, & Tefft. (2009). *Can soft drink taxes reduce population weight*.
- Fletcher, J. M., Frisvold, D., & Tefft, N. (2014). Non-Linear effects of soda taxes on consumption and weight outcomes. *Health Economics* .
- Government Office for Science. *Tackling obesities: future choices - project report*.
- Gucake, W. (2015). *A conceptual basis and evidence base for health tax*. New Zealand Treasury intern research report.
- Gupta, A. (2015). *News Analysis: Soda Is the New Tobacco*. Tax Notes.
- Harrington, S. (2008). The role of sugar-sweetened beverage consumption in adolescent obesity: a review of the literature. *Journal of Scholarly Nursing* , 24 (1), 3-12.
- Health Promotion Agency. (2014). *How Much Sugar Do You Drink*. Wellington: Health Promotion Agency.
- Jacobson, M. F., & Brownell, K. D. (2000). Small Taxes on Soft Drinks and Snack Foods to Promote Health. *American Journal of Public Health* , 90 (6), 854-857.
- Leicester, A., & Windmeijer, F. *The 'fat tax': economic incentives to reduce obesity*. Institute for Fiscal Studies.
- Lin, B.-H., & Smith, T. A. (?). *The Effects of a Sugar-Sweetened Beverage Tax: Consumption, Calorie Intake, Obesity, and Tax Burden by Income*. Washington, DC.: Economic Research Service, USDA.
- Madden, D. (2013). The Poverty Effects of a 'Fat-tax' in Ireland. *Health Economics* , 24, 104-121.
- Malik, V. S., Popkin, B. M., Bray, G. A., Despres, J.-P., & Hu, F. B. (2010). Sugar-sweetened beverages, obesity type 2 diabetes mellitus and cardiovascular disease risk. *Contemporary Reviews in Cardiovascular Medicine* , 1356-1364.
- McDonald, A. (2015). *Sugar-sweetened beverage tax in Pacific Island countries and territories: A discussion paper*. Noumea, New Caledonia.
- Ministry of Health. (2015). *Childhood Obesity - Preliminary Advice on Health Taxes*. Wellington: Ministry of Health.
- Ministry of Health. (2015). *Childhood Obesity - Preliminary Advice on Sugar Taxes*. Ministry of Health.

- Ministry of Health. (2003). *NZ Food NZ Children: Key results of the 2002 National Children's Nutrition Survey*. Wellington: Ministry of Health.
- Moodie, M., Sheppard, L., Sacks, G., Keating, C., & Flego, A. (2013). Cost-Effectiveness of Fiscal Policies to Prevent Obesity. *Current Obesity Reports* , 2, 211-224.
- Mytton, O., Clarke, D., & Rayner, M. (2012). Taxing unhealthy food and drinks to improve health. *British Medical Journal* , 344.
- National Health Service. *How much sugar is good for me*.
- Nestle, M. a. (2000). Halting the obesity epidemic: a public health policy approach. *Public Health Reports* , 115, 12-24.
- New Zealand Beverage Guidance Panel. (2014). *Policy Brief: Options to Reduce Sugar Sweetened Beverage (SSB) Consumption in New Zealand*.
- Nnoaham, K. E., Sacks, G., Rayner, M., Mytton, O., & Gray, A. (2009). Modelling income group differences in the health and economic impacts of targeted food taxes and subsidies. *International Journal of Epidemiology* , 38, 1324-1333.
- OECD (sassi). (2010). *Obesity and the Economics of Prevention*.
- Organisation for Economic Cooperation and Development. (2015). *Roundtable on health-related taxes on food and non-alcoholic beverages in OECD countries: background note*. Paris: OECD.
- Powell, L. M., Chriqui, J. F., Khan, T., Wada, R., & Chaloupka, F. J. (2013). *Assessing the potential effectiveness of food and beverage taxes and subsidies for improving public health: a systematic review of prices, demand and body weight outcomes*. International Association for the Study of Obesity.
- Riddiford, J. (2015). *Fizzed Out: Why a sugar tax won't curb obesity*. Retrieved from http://www.taxpayers.org.nz/fizzed_out
- Ruff, R. R., & Zhen, C. (2015). Estimating the effects of a calorie-based sugar-sweetened beverage tax on weight and obesity in New York City adults using dynamic loss models. *Annals of Epidemiology* , 350-357.
- Sassi, F. (2010). *Obesity and the Economics of Prevention*. Organisation for Economic Cooperation and Development.
- Sharma, A., Hauck, K., & Siciliani, B. H. (2014). The Effects of Taxing Sugar-Sweetened Beverages Across Different Income Groups. *Health Economics* , 1159-1184.
- The Treasury. (2014). *Options for regulatory responses to the growing obesity problem*. Wellington: The Treasury.
- Wang, Y. C., Bleich, S. N., & Gortmaker, S. L. (2008). Increasing Caloric Contribution From Sugar-Sweetened Beverages and 100% Fruit Juices Among US Children and Adolescents. *Pediatrics* , 121 (6).
- Wang, Y. (2001). Cross-national comparison of childhood obesity: the epidemic and the relationship between obesity and socioeconomic status. *International Epidemiological Association* , 1129-1137.

Zhang, Q., & Wang, Y. (2004). Socioeconomic inequality of obesity in the United States: do gender, age, and ethnicity matter? *Social Science & Medicine* , 1171–1180.

Pages 30-35 redacted under s18(c) The Statistics Act s37(4)

RELEASED UNDER THE
OFFICIAL INFORMATION ACT



1 min

Good afternoon! My name is s9(2)(g)(i) and I'm an intern in Tax Strategy at Treasury. I'd like to thank you for inviting me to present at your policy roundtable today. I know some of you are interested in this topic – especially those who attended WP2 at OECD last year.

As I'm sure you're well aware, sugar taxes have been much debated in the New Zealand media recently as a policy for combating obesity.

Many European countries, Mexico and several Pacific Islands have introduced sugar taxes.

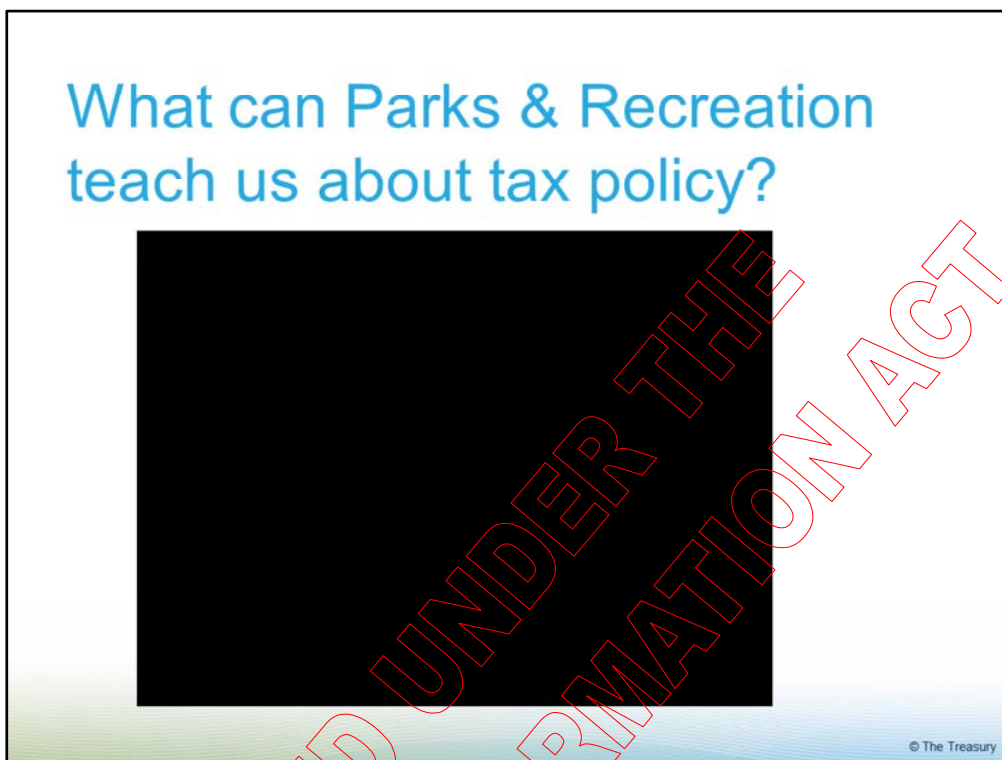
This has led to calls from health lobby groups to implement such a tax here.

To provide some context, Treasury advice to the Minister of Finance in 2014 acknowledged the potential for a sugar tax to play a part in the fight against obesity, but noted that more research needs to be undertaken to determine the trade-offs involved, implementation issues and potential adverse effects. The Ministry of Health took a similar view.

We hope that our research will help fill in some of the knowledge gaps to help inform policy making.

While a major part of my project involved determining how a sugar tax would impact consumers of different income groups, I also analysed the policy justification for a sugar tax and its potential effectiveness.

But first...let me illustrate the problem of excess sugar consumption with the help of Leslie Knope from Parks & Recreation!



1 min

[play clip]

So I think the key takeaways (pun intended) from this clip are that

1. Sugar is embedded in our lives,
2. Soft drinks (also known as SSBs- sugar sweetened beverages) are a vehicle for consuming large quantities of sugar quickly. I was astonished when I learnt that the average 375mL can of coke contains a third more sugar than the TOTAL recommended daily intake of sugar. Soft drinks are also less-satiating than solid food, which means it is easier to consume high quantities of sugar without feeling full. This explains why they are the most common sugary product taxed, and formed the basis of our modelling.
3. Are soft drinks too cheap? In some cases cheaper than bottled water or milk. Does this justify a tax?
4. "What did they put in it, it tastes so good!" Sugar consumption also releases dopamine, creating a pleasant sensation that can easily lead to addiction.

[possibly open floor for ideas?]

Excess energy intake is the biggest driver of obesity, more important than lack of exercise. Treating obesity-related illnesses costs \$624 million / year or 4.4% of New Zealand's health care expenditure, a large proportion of which is picked up by the taxpayer. Obesity rates are on an upward trend, and childhood obesity is alarmingly high. So Treasury has an interest in reducing the future fiscal cost from these products.

If this is a market failure, if people are consuming excess quantities of soft drinks and imposing social costs on the population, does this justify government intervention similar to alcohol and tobacco?

Parks & Rec sugar tax clip: <http://youtu.be/wNLUwBot8B0>

Key questions

- Is it well-targeted? (on the contributors to obesity and high-risk population groups)
- Does it have the intended effect? (reducing sugar consumption)
- Are there any undesirable side-effects? (regressivity)

© The Treasury

2 min

I'm going to be focusing on three key questions around health-related taxes today – I can't promise to answer these fully as the research is still in progress, and in some cases there are gaps in the data.

Firstly, is the tax well-targeted? Unpacking this a little, does the scope of the tax encompass those products that are the biggest contributor to sugar and energy intake?

And also, does the incidence of the tax fall predominantly on the obese and those at risk of becoming obese? If we are to incentivise a change in behaviour and achieve a measurable reduction in obesity rates, the tax needs to target the population groups that consume the greatest amount of sugar/soft drinks. There would be no sound health rationale for reducing consumption among those that already consume low quantities of soft drinks, as excess consumption is the problem.

Secondly, is a tax an effective policy instrument for incentivising a change in behaviour? Will it lead to a measurable reduction in consumption, and will this in turn lead to a reduction in sugar and energy intakes, and ultimately improved health outcomes?

Finally, are there any undesired side-effects from the tax, especially its regressive implications? Will the tax burden be higher for lower-income households, due to their higher proportion of expenditure on sugary products? What are the implications?

I'll frame my presentation around these three topics, but I can't promise to answer all of these questions today, as there is a lot more research still to be done!

I'll speak for around 15-20 minutes and then we can have a discussion...

Project overview

- Targeting → Literature review on share of calorie consumption from soft drinks
- Effect on consumption → Literature review on elasticities
- Regressivity → Calculation of budget shares from HES data
- *TBC: Model effects on consumption*
- *TBC: Estimate weight and obesity reduction*

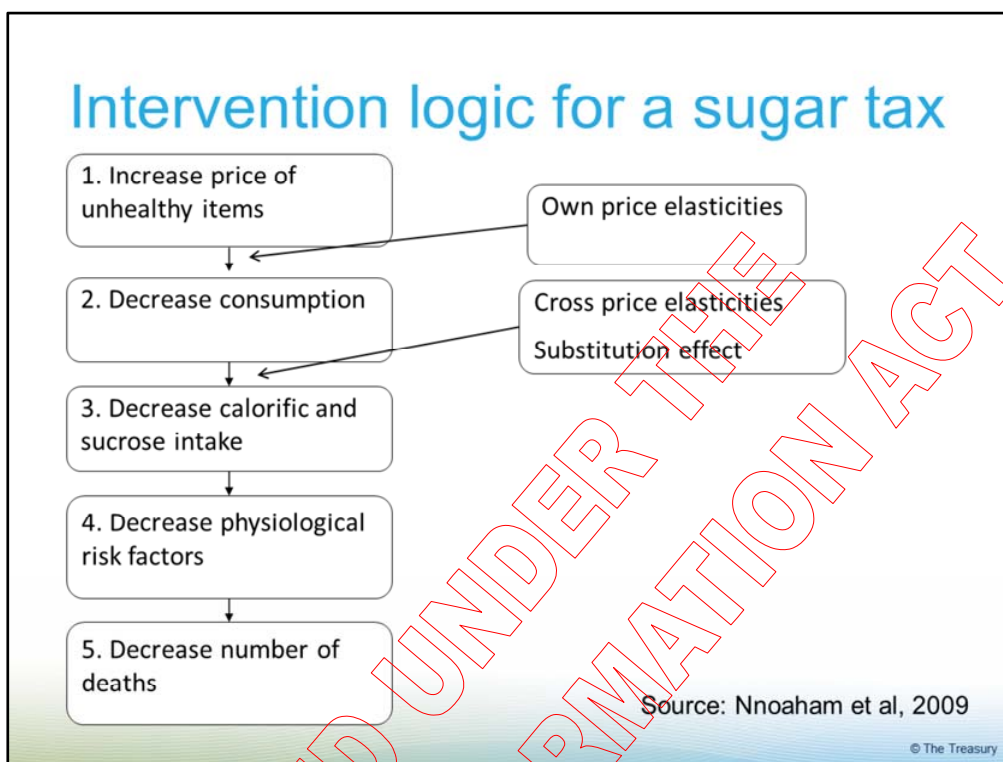
© The Treasury

2 min

To address the question of targeting, the project involved a literature review to determine the share of energy and sugar consumption from soft drinks, addressing the targeting question, as well as review of studies on elasticities.

A major part of the project involved calculating the proportion of total household expenditure that consumers of different income groups spend on the products we are proposing to tax, to answer the question of whether the tax would be regressive.

Still to be completed, are modelling the tax's predicted effects on consumption and estimating the reduction in average weight of the population, and obesity rates, that may result.



3 min

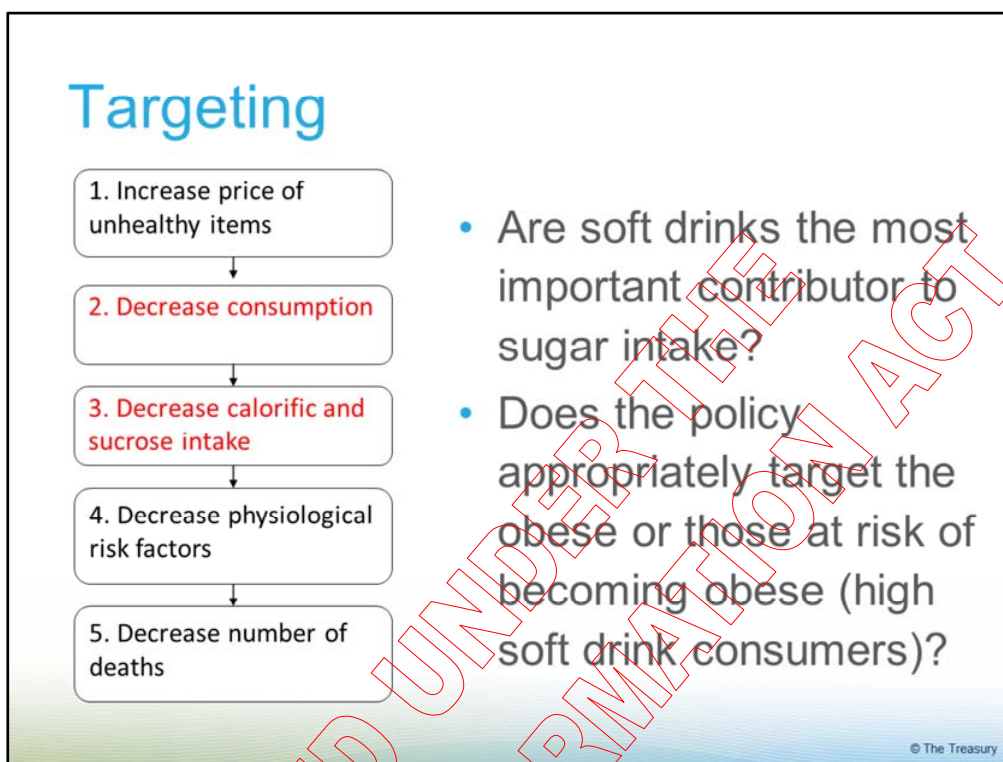
Here is a high-level view of what a sugar tax is designed to achieve. The focus today will be on the relationship between 1) and 2), and 2) and 3).

Imposing a tax increases the price of a good, which economic theory says will decrease consumption.

However the extent to which consumption declines depends on the consumers' sensitivity to the price increase. Elasticities vary across different products, different consumer groups and even individual consumers. It is also affected by the rate of the tax rate (refer back to earlier point about difference between health related and revenue generating taxes), [other factors?]. We've collected data on elasticities from the literature that will help us model the reduction in consumption from a tax.

By decreasing consumption of unhealthy products it is hoped that there will be reduction in the average consumer's intake of energy and sugar. However this relationship is not clear-cut either. While the intention is for consumers to substitute healthier products for the unhealthy ones, for example water instead of soft drink, this may not necessarily happen to the extent intended. Items not typically included in a sugar tax, such as fruit juice, contain high quantities of sugar. There is also the issue of consumers getting their sugar fix from chocolate, ice cream etc, and there is little data available on the cross price elasticities between beverages and solid food.

Ultimately the goal is to decrease the burden on the health system.



1 min

Findings:

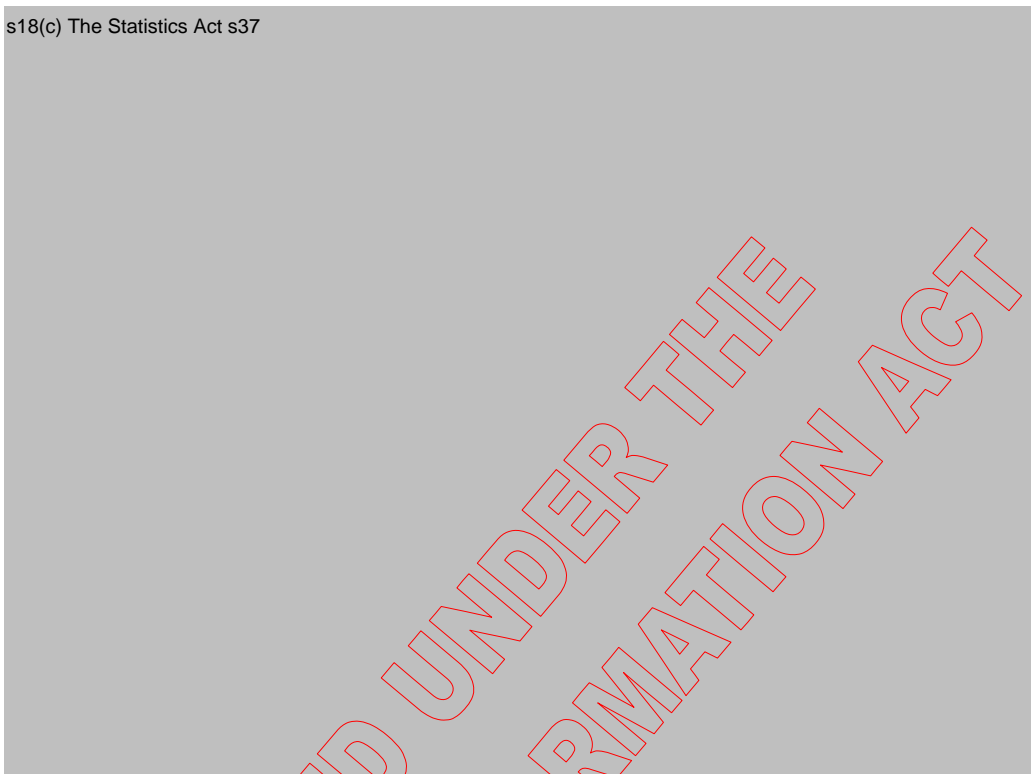
1) It appears that soft drinks are an important contributor to sugar intake for the average NZ adult, amounting to 17% of average daily sugar intake, according to the NZ Beverage Guidance Panel, (or around 5% of total energy intake) and therefore a tax on soft drinks would be well targeted on this contributor to sugar intake (This is the second highest contributor to total sugar intake behind fruit but above sweets). Note that focusing on sugar makes the tax appear well targeted but energy appears not to be. However, the fact that soft drinks provide no nutritional value and there are other illnesses besides obesity means targeting soft drinks would be justified.

1) [While it is was easy to find many US studies, reflecting US consumption, NZ data was harder to find. There was high variability in the US estimates – 5-15% of total energy consumption]

2) Intention to target the obese, or those at risk of becoming obese (high SSB consumers) to reduce obesity rates

If a healthy person, or light SSB drinker drastically reduces their consumption of SSBs, unlikely to see any significant improvement in health outcomes. It may not – very difficult to specifically target high consumers – do you tax every third coke people buy in a week?

s18(c) The Statistics Act s37



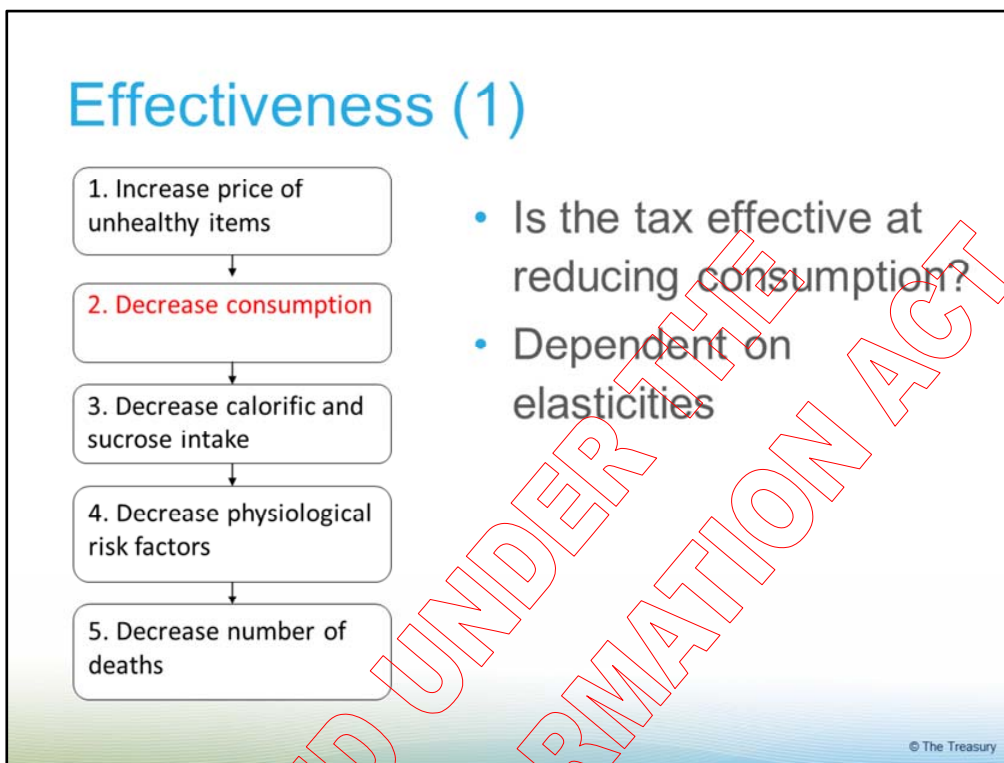
2 min

A major part of the project involved calculating budget shares – that is, the proportion of household expenditure consumers spend on sugary products. This is equivalent to the average tax rate imposed on consumers of these expenditure groups.

We calculated this for various different household types – singles, couples, couples with children – and ethnicities.

This is the graph for all households. On the x axis we have total annual household expenditure and on the y axis we have the proportion of expenditure these people spend on the targeted products. The solid line represents expenditure on soft drinks and the dashed line represents other sugary products – this includes chocolate, ice cream, desserts, etc.

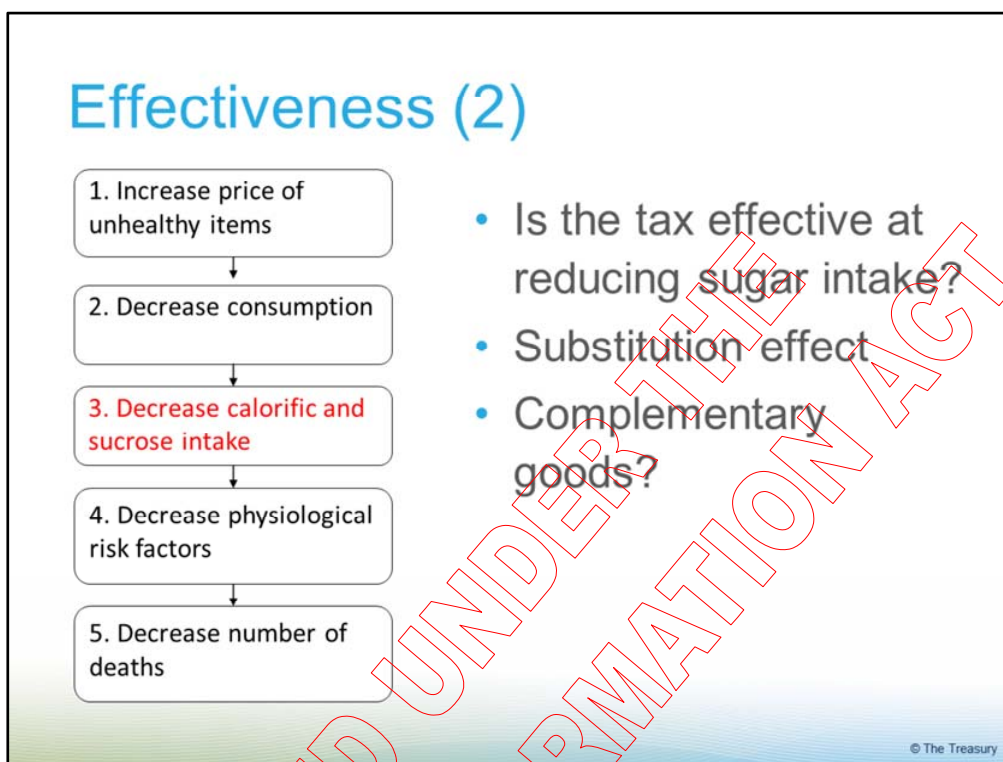
The fact that the lines are downward sloping indicates that both forms of taxes would be regressive – soft drinks mildly and all sugary products moderately.



0.5 min

This stage of the research is still in progress.

Theoretically we can model effect on consumption with a given tax rate and elasticities.



0.5 min

Is the tax effective at reducing sucrose intake? (i.e. Does the reduction in consumption translate to a reduction in sugar intake) Because while consumption of soft drinks may decline, consumers may switch to equally sugary products that are not taxed, such as fruit juice, or they may gain their sugar fix from consuming more chocolate or sweets.

This depends on the size of the substitution effect, which depends on the cross-price elasticity between the taxed product and the substitute.

The extent to which this problem occurs also depends on the scope of the tax – if you include these potential substitutes – e.g fruit juice or energy drinks – which represents a trade off between effectiveness and administrative feasibility.

There were not many studies which calculated the cross price elasticity between different beverages, and none that looked at the cross price elasticity between sugary beverages and sugary food.

There were two studies which stated that regular soft drinks and diet drinks are complements, which we found strange. Intuitively we would expect a tax on sugary drinks to increase the attractiveness of alternatives like Coke Zero, which contain no sugar

Note literature which states that regular soft drinks and diet drinks are complements

Scope of tax

Conclusions

- Soft drink tax weakly regressive; sugar tax moderately regressive
- Weak targeting of high-risk population groups
- Substitution effect may be significant
- Still in progress: check back in a month!

© The Treasury

1 min

To conclude, our analysis has confirmed that sugar taxes are likely to be regressive.

If a tax was introduced, targeting soft drinks would focus on a key contributor to sugar intake. But what do we include within this category, energy drinks or fruit juice? Do we include products sweetened with artificial sweeteners?

A tax is a blunt instrument that weakly targets high-risk population groups as it doesn't focus on high consumers – but this is where other policy interventions such as education or regulation may be more effective.

The substitution effect could be an impediment to achieving the outcome we want – and needs further investigation.

Thank you!

- Discussion time

© The Treasury

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

Additional material

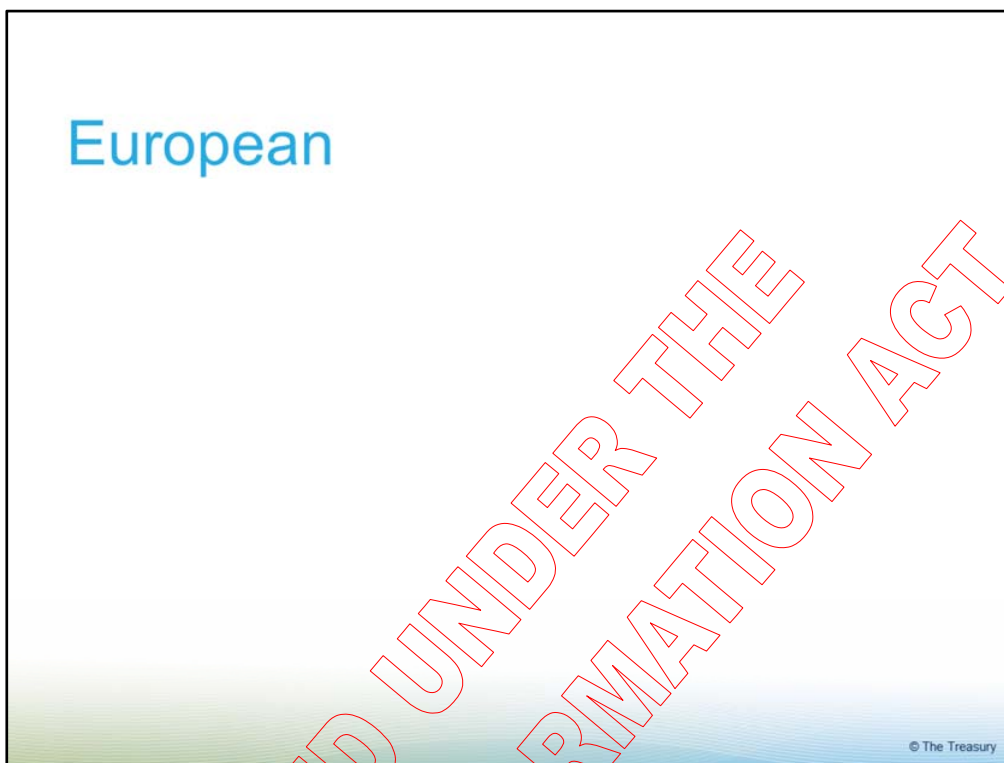
RELEASED UNDER THE
OFFICIAL INFORMATION ACT

© The Treasury

s18(c) The Statistics Act s37

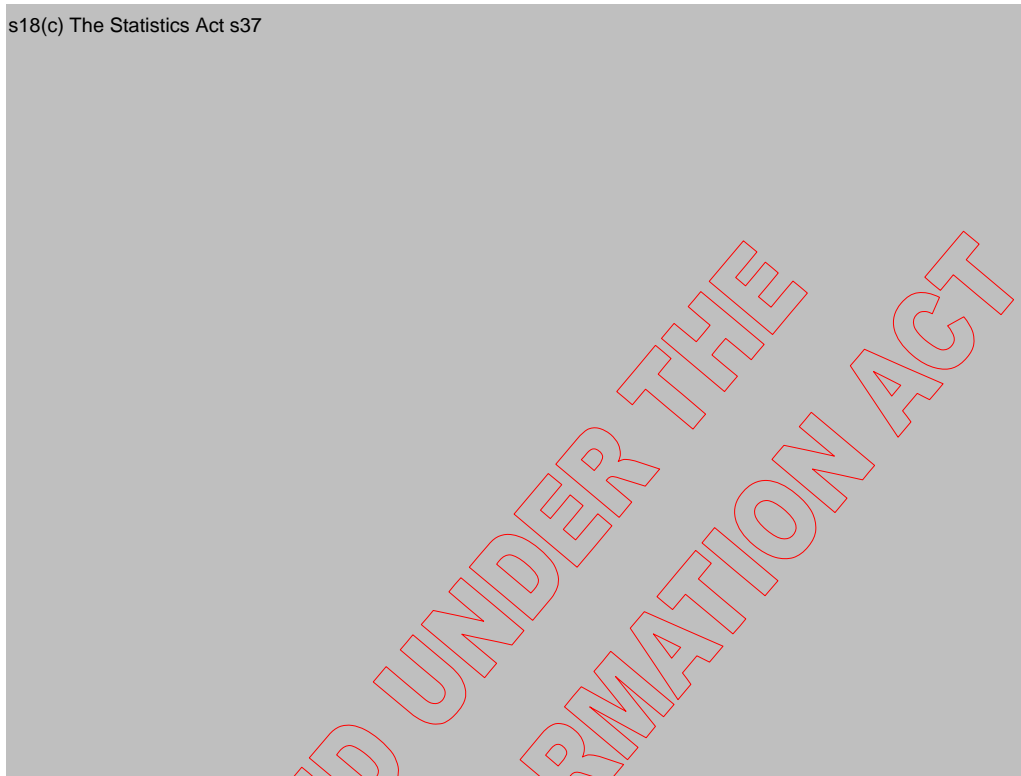
Budget shares for Maori are the opposite of the result obtained for the total population. Higher-income Maori spend a greater proportion of their income on SSBs (albeit a slightly lower proportion of other sugary products), than lower-income Maori. Therefore, an SSB tax is likely to have a progressive incidence on Maori. However, the small sample size of 873 households reduces the validity of this conclusion.

RELEASED UNDER THE
OFFICIAL INFORMATION ACT



The consumption pattern for European New Zealanders closely matches that of the total population, which is expected given that 74% of New Zealand's population falls into this category (Statistics New Zealand, 2013).

s18(c) The Statistics Act s37



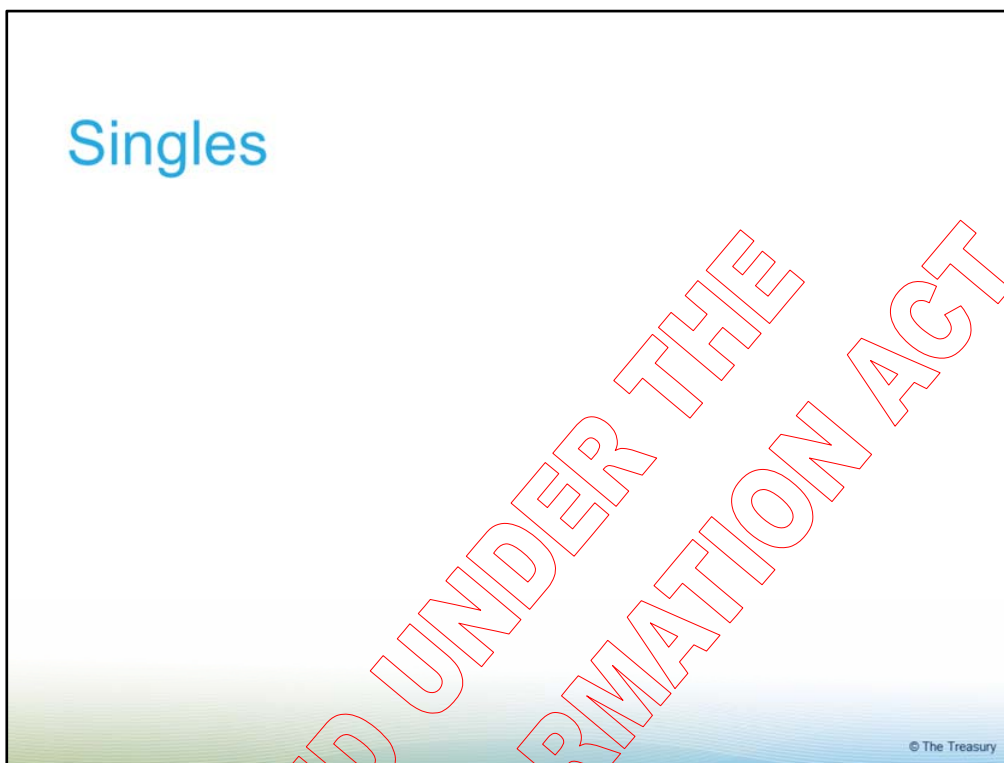
Budget shares for Pasifika are higher than the total population for both categories of product. The high variability reflects the small sample size of Pasifika households in the HES.

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

s18(c) The Statistics Act s37

Children increase average SSB consumption among lower-income households, but it appears that they have negligible effect on expenditure proportions among higher-income groups.

RELEASED UNDER THE
OFFICIAL INFORMATION ACT



Single adult households spend a lower proportion of total expenditure on sugary products than average,