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**title** Fiscal policy levers to improve diets and prevent obesity

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**policy issue** Preventing obesity is a high priority for Australian governments. While individuals have a responsibility to manage their own diet and weight, governments also have a role to play. Governments can enable individual health promoting behaviours through a range of means including: the physical environment (for example, by providing access to cycle paths that are safe), economic incentives (for example, by imposing taxes on unhealthy foods), policies (for example, by funding health services that help people lose weight), and social-cultural factors (for example, advertising campaigns designed to change attitudes, beliefs, perceptions, values and norms of the societal or cultural group).

This paper considers the evidence regarding economic incentives in the form of targeted taxes and subsidies on food and beverages.

**what does the evidence say?** Targeted taxes are known to influence the decisions that consumers make and can be used to encourage healthy eating. This is most effective when taxes are applied to foods for which there are close untaxed healthy alternatives available (e.g., low-fat milk versus whole milk, 'diet' versus full sugar soft drinks). Heavier taxes (20-40 per cent) are more likely to be effective than lighter taxes. However, it is difficult to quantify consumer responses to taxation and to accurately assess the impact on downstream indicators such as obesity and chronic disease outcomes. Key factors affecting the impact of taxation include the target food selected, the size of the tax, the extent to which the tax is reflected in consumer prices, and the aim of taxation

(e.g., dietary improvement, revenue raising, reducing obesity).

Reviews of the evidence indicate that taxes are likely to be an effective component of a comprehensive intervention to encourage healthy eating. [1,2] Subsidies can also be effective in increasing consumption of healthier options. However, they may also encourage greater overall consumption and hence increase total calorie intake.

## what is the quality of the evidence available?

There has been a dramatic increase in the number of studies published over the past five years regarding taxing (or subsidizing) food to improve diets and health. A review of studies published before June 2009 found a total of 24 studies [1], compared with 34 new studies published between January 2009 and February 2012. These new studies are generally of much higher quality and have taken into account many of the limitations identified in earlier reports. Most of these studies have been conducted in high-income countries, many in the USA. This Evidence Brief presents an overview of the evidence for fiscal policy measures, including the information from these new higher-quality studies.

### Evidence for taxes on different types of food

Taxes on sugar-sweetened beverages are the most common proposal [1, 3-11], as these beverages are easy to define. They are a high-energy/low-nutrient food group, and soft drink consumption is associated with negative health consequences such as overweight, decreased bone density and dental decay [12]. Most studies show that consumers will reduce their purchase and consumption of soft drink as a result of a tax, with larger taxes more likely to be effective (20 per cent or more). Many studies also show a reduction in overall calorie consumption, due to a total reduction in beverage consumption and/or substitution of diet beverages[6]. One study examined the effects of a sugar-sweetened beverage tax for children and adolescents and found that soft drink consumption decreased while milk consumption increased. As a result, calorie consumption (and therefore overweight) didn't decrease [13], but this is a positive nutritional outcome considering the higher nutrient content of milk compared to soft drink. Several Pacific Island Countries have implemented taxes on soft drinks to promote health [14].

Fat and calorie-based taxes are another popular proposal for improving diets and health because of the link between high fat and energy intakes, and obesity and chronic disease [15, 16]. Taxes on high-energy/ low-nutrient foods reduce calories purchased and consumed, especially if they increase the price of high-energy foods by a significant amount (20-50 per cent) [17-20]. Taxes on fat appear to be less effective in reducing consumption [21-24], possibly due to the fact that they do not discriminate between core foods (e.g. milk) and foods with low nutrient density

(e.g. lollies) [1]. In 2011 Denmark implemented the first ‘fat tax’ on products with more than 2.3 per cent saturated fat. These are taxed at 16 kroner per kilogram (\$2.90 USD) of saturated fat, which translates to around a 30 per cent price increase for butter, and 10 per cent for a packet of chips [25].

Analyses of ‘junk food taxes’ and taxes based on nutrient profiling (e.g. traffic light labeling) show that they reduce consumption of unhealthy foods [26]. A recent Australian study estimating the effect of a junk food tax (on biscuits, cakes, desserts, pastries, fried foods, chips, confectionery and soft drinks) found that consumers would reduce their intake in response to a tax that increased prices by 10 per cent, with a corresponding decrease in body weight, and that the intervention would be both effective and cost saving [27].

Subsidies on healthy food have been proposed to increase purchasing and consumption, and to encourage substitution for unhealthy foods. Earlier studies suggested that this might be the case, however, more recent studies have suggested that subsidies are actually more likely to encourage consumption and increase total calorie intake, and may disproportionately benefit the already well-off rather than assisting low-income households [17, 19, 24, 28, 29].

#### Evidence from different types of studies

In this section we consider the same evidence presented above, but categorized by study type rather than food type, to give an idea of the kinds of analyses found, and their strengths and limitations.

One randomized controlled trial has been conducted to date in this area, on subsidies. This is generally a very robust method, as comparable subjects are allocated randomly to have the tax or subsidy imposed and then compared with controls. In this case, participants were randomly allocated to receive price reductions (12.5 per cent) on certain healthy foods at a particular supermarket. Purchases of these healthy foods increased, although there was no effect on saturated fat intakes [22].

Experimental choice studies have been conducted in the Netherlands and the USA, in which participants perform food choice tasks with price differences reflecting taxation and subsidies. These studies give a good idea of the direct effect of taxes and subsidies on consumer behavior, but are also limited by the experimental settings in which they are conducted (e.g. online shopping or computer-based menu selection). These studies suggest that consumers respond to taxes at the point of purchase by reducing purchases; they respond to subsidies by increasing purchases [17-20, 26, 28].

Household level scanner (e.g. home-based surveys of food purchases by AC Nielsen) and expenditure data have been used to create economic models to analyse the likely effect of taxation on purchases. The main limitation of this method is that it usually only captures purchases consumed at home. These studies show that heavier taxes have a stronger effect on food choices [5, 7, 8, 21, 23, 30].

Economic analyses of long term consumption data and prices have been performed using data at national, state, and individual level to estimate the effect of taxation, usually on soft drinks. These show a likely reduction in consumption of sugar-sweetened beverages in response to taxation. One study has considered substitution between beverage categories, finding that a 20 per cent tax on sugar-sweetened beverages will significantly decrease consumption and consumers will increase fruit juice, low fat milk, coffee and tea intake [6]. One older study from Ireland examined consumer responses to an actual change in soft drink taxation, taking into account other influences on consumption such as the weather, and showed found that a 20 per cent reduction in the soft drink tax resulted in a significant increase in average soft drink consumption [31]. Data from one 20-year study showed that an increase in the price of soft drink and pizza is associated with reduced calorie consumption, body weight and insulin resistance [32].

Economic analyses of the correlation between state-level taxation and body weight in the USA generally show little to no association [13, 33], as do longitudinal studies examining food price changes and body weight [34, 35]. These studies are limited because there are a large number of other potential variables affecting weight change, and they cannot determine the actual price that consumers pay for given foods.

#### Other effects of taxation

Taxes may reinforce efforts to educate consumers and public awareness that a product has been taxed because it is unhealthy may discourage purchases. A Canadian researcher, Ryan Lacanilao, and his colleagues observed this effect when warning labels were placed on products that were taxed because of their high fat content [36].

Regressivity (a greater tax burden for low income earners) is a potential concern with any type of taxation. When it comes to food, low income households usually spend a greater proportion of their income on food than higher income households, and are thus especially vulnerable to increases in food prices. However, the overall effect of regressivity depends on the type of food taxed. Some studies have found that the higher price sensitivity of low-income households mean that they are more likely to reduce their consumption in response to a tax and thus pay less tax than

high-income households, particularly if it is a targeted tax (e.g. on sugar-sweetened beverages), with untaxed close substitutes available [5, 7].

Other studies suggest that because low income earners often have poorer health outcomes, they may benefit disproportionately from improvements in their diets due to a tax. Some studies find that the poor would spend a greater proportion of their income on unhealthy food or beverage taxes than the wealthy, both because of their smaller income and because they often have higher consumption levels to begin with. This means that even though they reduce consumption more than the wealthy in response to the tax because of higher price sensitivity, they still end up consuming around the same amount as wealthier families and thus paying the same amount of tax [21, 37].

#### Gaps and challenges

The main impediments to identifying the true impact of taxes on diets, body weight and health/disease outcomes are:

- Real world effects of taxation on price are unclear (sometimes overshifting – a higher price increase than that due to the tax – is observed, sometimes undershifting)
- It is difficult to predict the full effect of changes to purchasing and consumption might be – and the factors that are considered in a model significantly affect the result. For example, the primary effect of taxation is on point-of-purchase decision making. This affects purchase of the target food, close substitutes and other foods; then dietary consumption; calorie and nutrient intakes; and potentially weight and health. A team of Israeli researchers have even considered flow on effects on time use, assessing whether individuals are likely to respond to a tax on food purchased away from home (e.g. fast food) by cooking at home more, and whether time spent cooking takes away from time spent exercising [24]. Overall, points to keep in mind when assessing the quality of evidence in relation to taxation are:
  1. Studies that consider the effect of a tax on the target food only are likely to miss the effects on the diet as a whole – if purchase of the target food decreases, it is good to have an idea of whether substitution is occurring.
  2. Studies that consider the effect of taxation on close substitutes and other foods, as well as the target food, are more likely to give a comprehensive idea of the effect of the tax on broader nutrient intake.

3. Studies that make the link to weight and health outcomes are often affected by significant assumptions that make them unlikely to yield useful data.
- Experimental conditions cannot replicate real life, but they do allow researchers to collect demographic data on participants (e.g. income levels to determine whether taxes are regressive) and to examine responses of specific population groups to taxation.

## what does this mean for policymakers?

Policy objectives have a significant impact on the policy instrument chosen [38]. If the aim is to shift consumer behaviour away from whole categories of foods or nutrients, price changes would appear to have to be very large to have an effect and even then, the impact would depend substantially on the details of the policy design. Consumers are far more likely to be responsive to taxes that aim to shift consumption between close substitutes.

Policymakers need to consider the most appropriate instrument and ensure that the targeted food can be easily identified for taxation purposes. The main instrument applicable to Australia is an excise tax which applies to both imported and domestically produced food, similar to that imposed upon alcohol. Definition of food categories by the Australian Taxation Office (ATO) at this time includes carbonated soft drinks and a range of other sugar sweetened beverages (chocolate flavoured milk, ready-to-drink teas etc.), all of which are currently subject to a Goods and Services Tax (unlike whole or minimally processed food). However, there is currently no differentiation between sugar-sweetened and non-sugar-sweetened carbonated soft drinks. (See ATO, [Detailed food list](#)). Close collaboration between health and finance policymakers is essential for effective policy development.[39]

## key readings

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