Senate Select Committee into the Obesity Epidemic in Australia

A discussion of the contested distinction between academic analysis and advocacy in the literature on a tax on sugar-sweetened beverages

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Not confidential

Introduction

In a recent academic publication, I disputed the claim by the Grattan Institute that, in its well-publicized report, Grattan had provided a solid case for a 20 per cent tax on sugar-sweetened beverages in Australia.

The more I read in the area, the more convinced I became that, not only had no one yet made a satisfactory case, but also—and this is the topic of my submission—that the literature often ignored the distinction between analysis and advocacy.

And this in two forms: first, and most egregiously, by not searching for evidence that did not support or may not support the pre-determined policy proposal; secondly, and relatedly, by evaluating only a subset of the full range of effects that would flow from the proposal.

These reflections were reinforced by what one referee wrote about the article I submitted:

> My main concern with this is that opponents of soft drink tax will use this paper to argue their case when there is clearly economic case for such a tax as is clear from evidence nationally and internationally. Recently data from actual implementation of tax has started trickling in suggesting effectiveness of such tax in reducing soft drink consumption and obesity. Thus such a paper in public domain will unnecessarily create a controversy not warranted when several governments are seriously considering imposing such a tax.

Apparently, I must be wrong (and maybe wicked) because the tax would have an effect, and several governments are 'seriously considering' such a tax. (Not surprisingly, the referee did not address any of my arguments.)

This referee, like much of the literature, starts with the presumption that the tax is a good idea: obesity is bad; the tax would reduce the incidence of obesity (and other diseases); therefore, the tax is good public policy.

An analogy with tobacco was frequently used, and assertions from behavioural economics were often drawn upon, especially Sunstein and Thaler's oxymoronic phrase, libertarian paternalism: Tax them, *pater*, for they know not what they do.

However, to demonstrate that a corrective tax is a good idea requires that the proponents first to show that the tax would be efficacious and then to argue that, given its likely effects, the tax would satisfy some well-specified policy criterion. That is, not only address Tony Blair's question—What Works—but also the more difficult query—Is it Worth Doing? I will take these in turn.

Efficacy

Undoubtedly, the tax would reduce the consumption of sugar-sweetened beverages, but by how much would the fall in that consumption reflect in a fall in energy intake and, consequently, a fall in weight?

That is, the objective of reducing the incidence of obesity requires more than that the tax would reduce the consumption of the taxed commodity. In particular, it requires that a reduction in the intake of energy in the form of sugar-sweetened beverages manifest in a significant and lasting reduction in weight.

Here, medical scientists turn to what they call 'the gold standard', which is evidence from randomized controlled trials of one treatment versus another. And the lead article in a 2009 issue of the *New England Journal of Medicine*, by Brownell and others, reported on the evidence.

The results of a year-long randomised controlled trial on youngsters, 7 to 11 years of age was that, two years down the line, the treatment showed no effect on weight; similarly for the three other long-term randomised controlled trials cited by Brownell.

Yet Brownell strongly advocated a tax on sugar-sweetened drinks.

As one correspondent (Kaplan) to the *NEJM* put it,

> Before assigning blame for the obesity epidemic, we should have clinical evidence that an intervention to reduce the consumption of sugar-sweetened beverages is effective in achieving this goal [of long-term weight reduction].

I suggest that you cannot confidently assign blame unless you know the causal chain. If overeating is the culprit, what causes over-eating and especially, what causes over-eating of high-calorific items? Is it mostly that high calorific food and drink have become cheaper and more readily available; that sugar has been added more frequently and more commonly to everyday items; and that sugary food and drink have been cunningly advertised, including especially to children and the young, whose brains and metabolic systems can be modified by excessive sugar and the like? A recent theory, worthy of consideration, is that the obesity epidemic has been also or even mainly caused by the large decline in hours of sleep since the 1940s: for a summary of the scientific evidence, see Matthew Walker, *Why we Sleep*, Chapter 8.

Back to my main story: The Brownell article has been cited over 700 times. I looked at many of them, but not all 700; rarely did I find a reference to the

negligible effect of reducing the intake of sugar-sweetened beverages; Kaplan's comment has been cited nine times only.

Another, albeit less egregious example from a different article, this one in 2014:

> The potential health impacts of imposing large taxes on soda [i.e., soft drinks] to improve population health have been of interest for over a decade. As estimates of the effects of existing soda taxes with low rates suggest little health improvements, recent proposals suggest that large taxes may be effective in reducing weight because of non-linear consumption responses or threshold effects… Our findings suggest virtually no evidence of non-linear or threshold effects (Fletcher et al., 2014).

Yet, in the body of the article, we have the following:

> However, using a variety of specifications, we find no evidence of effects on use or weight for a nationally representative sample of adults. … Together, our results cast serious doubt on the assumptions that proponents of large soda taxes make on its likely impacts on population weight.

Bully for them for reporting the null result; but why not in the Abstract? Nine extra words would do the job:

> Our findings suggest virtually no evidence of non-linear or threshold effects or, in fact, of any effects at all.

Otherwise, a reader of the abstract may well assume that the effect was linear, meaning that a quadrupling of the tax would quadruple the reduction in the consumption of sugar-sweetened beverages. Yes indeed: four times nothing is nothing.

The causal chain of interest goes from a rise in price due to the tax, causing a reduction in sugar-sweetened beverages, in turn causing a reduction in energy intake, which leads to a reduction in weight.

The last two links in this causal chain can be attenuated by consumer responses—in particular, the consumer may respond to the tax by replacing some or all of the reduction in sugar intake in the form of sugar-sweetened beverages, with an increase in the intake of other forms of energy. Also, but less importantly for evaluating a tax on sugar-sweetened beverages, the consumer's metabolism may adjust to a reduction in energy intake and so frustrate an attempt to lower the person's long-term weight through diet alone.

On the crucial question of the effect of a reduction in consumption of Sugar-sweetened beverages on weight, most of the literature that I read does not rely on trials, but finesses the issue by utilising a mathematical model that elides the gaps between a reduction in intake of sugar-sweetened beverages and a reduction in the intake of energy and in weight.

In this model, weight gain or loss depends only on the balance between energy intake and energy burnt in activity. By feeding into this model the evidence about the effect of a tax of around 20 per cent on purchases of sugar-sweetened

beverages, the literature generally predicts a reduction of around 1 or 2 kilos in the long-term weight of an obese person, which is more than Brownell found, but not much.

The conclusion of a 2014 survey by Sharma et al., of this sub-field of research on the effects of taxing sugar-sweetened beverages, does not stop the many advocates of the tax. The conclusion is that

' *evidence on the welfare implications of taxes on unhealthy products is inconclusive'*;

Note that, by the word ' welfare', they meant health outcomes only, and not some broader conception of wellbeing.

Policy criterion

I think that it is close to immoral for a health scientist to advocate a policy solely on the basis of its beneficial effects on health, and especially to cloak that advocacy with the garments of science. And there is more than a whiff of self-interest when the advocates of the tax recommend that the receipts be spent on health, which means on the very institutions that fund what they do.

Many, maybe most researchers in public health were attracted to the field by the desire to do good, through opportunities to engage in authoritative or expert advocacy of policy proposals; similarly, for many economists. In the literature on 'sin taxes', however, a significant difference seems to arise. It does seem acceptable for public health researchers to base their policy recommendations solely or almost entirely on claims about the effects on health. In contrast, it is not respectable for an economist to base policy advocacy solely on claims about the effects on 'the market economy', rather than on some more comprehensive conception of wellbeing, let alone welfare.

Some of the antagonism displayed towards economics, by those in other policy areas, seems due to the almost instinctive way in which economists rely on the notion of opportunity cost or trade-off, to argue that maximizing, say, health outcomes, is unlikely to be the best social policy.

However, if you strongly believe that far too few efforts are being made in the public health area; or if you accept with the World Health Organization that

'The enjoyment of the highest standard of health is a fundamental right of every human being',

then you may bridle at the economist's caution against adopting a policy solely on the basis that it improves 'public health' (or, increases the spending on public health).

Interpreted literately, the WHO would have a nation spend unlimited amounts on improvements in health, up to the whole of national income.

In contrast, note that the UN itself is more modest: Article 25 of the Universal Declaration of Human Rights mandates that

' Everyone has the right to a standard of living adequate for the health and well-being…including…necessary medical care...'.

That is, the UN recognises that health is important, but is not the only thing that is worth pursuing.

A conceptually respectable way of recognising that health is not the only good, is to use cost-effectiveness as the policy criterion. This is widely employed in health economics, but is too often misused in the literature on the SSB tax.

For example, there is a 2013 article entitled 'Cost-Effectiveness of Fiscal Policies to Prevent Obesity' by Moodie et al., which reported that the tax was very cost-effective. However, the authors only accounted for the administrative costs of a tax, and ignored the burden on consumers. Using the data provided in the Grattan report, I estimated that the burden on the consumers was around seven times the Parliamentary Budget Office's estimate of the likely administrative cost. Thus, the ratio of effectiveness to cost reported in this article was overstated maybe by a factor of seven.

(My estimate of the cost to consumers did not include the amount of tax paid, but only what we economists call the 'excess burden' or the 'deadweight loss' of the tax, or the 'reduction in consumer surplus' caused by the tax.)

In my article, I referred to a series of academic publications about or including the sugar-sweetened beverages tax, written by Australians, which use, as the policy criterion, the cost of achieving an additional life year, where the benefit of a year is adjusted for the quality of life, and so adjusted downwards for disability or ill health. This is called by various acronyms, most commonly QALY or DALY, for quality adjusted or disability adjusted life years.

The research projected the lifetime profile of the benefits, to a young adult cohort, of the various public health interventions and, as would any competent analyst, the researchers reduced that stream of benefits to a single number by the use of a time discounting factor.

Astonishingly, however, when evaluating the cost-effectiveness of policy, the researchers implicitly assumed that, over the next many decades, there would be no improvement in the treatment of illnesses. In my opinion, this neglect means that they overstated the gains in QALY, maybe hugely: the payoff from the public health interventions, including the sugar-sweetened beverages tax, may be much less than they have estimated.

No doubt, it would require heroic assumptions to take account of changes over the next forty years in health technology and its cost; however, sensitivity analysis could be used to test the effects of various assumptions. (See the Productivity Commission 2005 report, *Impacts of Advances of Medical Technology in Australia*.) By not accounting for improvements in health technology, the research is at best misleading and at worst, biased by the desire to improve health outcomes.

And the confidence that leads the researchers to report their estimates to five or six significant figures suggests a maybe unconscious attempt to lend scientific authority to their policy recommendations.

However, at least the Australian research team went some way towards a defensible policy criterion, whereas the Grattan Institute's criterion was nonsensical: the tax was beneficial if the revenue it raised, from the obese and the non-obese, was at least equal to the health expenditure that it saved the non-obese. The costs that the obese imposed on the non-obese is what Grattan called 'third-party costs'. But third party costs would completely disappear if everyone were obese and so, under the Grattan criterion, there would be no case for a tax of sugar-sweetened beverages if everyone were obese.

Conclusion

Honest researchers made random mistakes. Committed researchers make systematic errors of omission and commission.

In the bio-medical area, an effect is first reported in the scientific literature, but independent replications of the experiment or trial typically generate much lower effects or none at all: the literature is replete with false positives. This and other phenomena led Ioannidis to publish an article in *PLOS Medicine* entitled 'Why most published research findings are false'. The article has garnered 6000 citations. His was a plea for better science, arguing, amongst other things, that the sample sizes of most randomised control trials are too small for any valid inferences to be made.

In this submission, my effort was much more limited and modest. I reported on what I consider are defects and deficiencies in the literature on the taxation of sugar-sweetened beverages, at least some of which I attribute to public health zealotry.

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