Estimated impacts of alternative Australian alcohol taxation structures on consumption, public health and government revenues

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MJA 2013; 199: 619–622
doi: 10.5694/mja13.10605

Online first 28/10/13

Abstract

Objective: To examine health and economic implications of modifying taxation of alcohol in Australia.

Design and setting: Economic and epidemiological modelling of four scenarios for changing the current taxation of alcohol products, including: replacing the wine equalisation tax (WET) with a volumetric tax; applying an equal tax rate to all beverages equivalent to a 10% increase in the current excise applicable to spirits and ready-to-drink products; applying an excise tax rate that increases exponentially by 3% for every 1% increase in alcohol content above 3.2%; and applying a two-tiered volumetric tax. We used annual sales data and taxation rates for 2010 as the base case.

Main outcome measures: Alcohol consumption, taxation revenue, disability-adjusted life-years (DALYs) averted and health care costs averted.

Results: In 2010, the Australian Government collected close to $8.6 billion from alcohol taxation. All four of the proposed variations to current rates of alcohol excise were shown to save money and more effectively reduce alcohol-related harm compared with the 2010 base case. Abolishing the WET and replacing it with a volumetric tax on wine would increase taxation revenue by $1.3 billion per year, reduce alcohol consumption by 1.3%, save $820 million in health care costs and avert 59 000 DALYs. The alternative scenarios would lead to even higher taxation receipts and greater reductions in alcohol use and harm.

Conclusions: Our research findings suggest that any of the proposed variations to current rates of alcohol excise would be a cost-effective health care intervention; they thus reinforce the evidence that taxation is a cost-effective strategy. Of all the scenarios, perhaps the most politically feasible policy option at this point in time is to abolish the WET and replace it with a volumetric tax on wine. This analysis supports the recommendation of the National Preventative Health Taskforce and the Henry Review towards taxing alcohol according to alcohol content.

Evidence suggests that alcohol taxation, as a means of increasing the price of alcohol, is one of the most effective policy interventions to reduce the level of alcohol consumption and related problems, including mortality rates, crime and traffic accidents.[1,2] Even small increases in the price of alcohol can have a significant impact on consumption and harm. Despite its reported effectiveness, taxation as a strategy to reduce alcohol-related harm has been underutilised in Australia.[3]

Aside from some positive features, such as lower tax on light and mid-strength beer and the higher tax on ready-to-drink products (RTDs), the alcohol taxation regimen in Australia is flawed from both an economic and public health perspective.[4] The National Preventative Health Taskforce reported that while there are some positive aspects to the current regimen, such as the relatively lower rate of tax on low-alcohol beer, there are large inconsistencies in the way different alcohol products are taxed — they are not consistently taxed according to their alcohol content level or their propensity to cause harm.[5] The Australian Government's own review of the tax system (the Henry Review) concluded that current taxes on beer, wine and spirits are incoherent and if alcohol taxes are to be effective in reducing social harm, the taxation of beer, wine and spirits should be reformed. The review highlighted that "in particular, the wine equalisation tax, as a value-based revenue-raising tax, is not well suited to reducing social harm". The ideal tax structure, it was suggested, would be a volumetric tax on all alcoholic beverages, applied at the same rate of tax per litre of alcohol across all beverages.[6] However, the review did not provide any detailed estimates or modelling of the optimal tax rate on alcohol nor how this would affect government revenue, overall consumption or changes in the social costs from harmful consumption.

There is growing evidence of public health benefits from taxing alcohol according to alcohol content. One study identified taxation as the most cost-effective strategy to reduce alcohol-related harm in Australia and suggested that the government could achieve over 10 times the health gain if they reallocated the current level of investment to an optimal cost-effective package of strategies starting with taxation changes.[7] This analysis was extended to measure the cost-effectiveness and change in taxation revenue as a consequence of a volumetric tax.[8] Collectively, these two studies demonstrate that a volumetric tax can increase government revenue and save millions of public dollars by averting alcohol-related disease and injury.

Our research undertakes further economic and epidemiological modelling to estimate the impact of alternative alcohol taxation structures on consumption, public health and government revenues.

Methods

Taxation scenarios

Seven different alcoholic beverage types are included in the scenario modelling: low-strength beer; high-strength beer; wine; fortified wine; straight spirits; RTDs; and cider. Of these seven, each is further disaggregated into offsite (bottle shops, supermarkets and alcohol warehouses) or onsite (licensed premises such as pubs, clubs and restaurants) sales.

The range of modelled taxation scenarios were selected on the basis

1 Base-case estimates of alcohol consumption, value and taxation receipts, using 2010 sales data and taxation rates

Alcoholic beverage	Annual quantity consumed, '000s litres	Annual litres per capita	Annual quantity consumed, '000s litres pure alcohol	Annual litres pure alcohol per capita	Annual value of consumption, $millions	Annual excise tax collected, $millions	Annual GST collected, $millions	Total annual tax collected, $millions	Price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer offsite*	127	5.7	4.1	0.18	$569	$102	$52	$154	$4.49	$1.78	$0.32
Low-strength beer onsite†	30	1.3	0.9	0.04	$399	$10	$36	$46	$13.52	$5.36	$0.14
High-strength beer offsite*	1463	65.5	67.3	3.01	$7683	$2060	$698	$2758	$5.25	$1.45	$0.39
High-strength beer onsite†	340	15.2	15.6	0.70	$5387	$337	$490	$827	$15.84	$4.36	$0.27
Wine offsite*	338	15.1	42.0	1.88	$3904	$559	$355	$913	$11.55	$1.18	$0.17
Wine onsite†	80	3.6	9.9	0.44	$3343	$132	$304	$436	$41.79	$4.26	$0.17
Fortified wine offsite*	14	0.6	2.7	0.12	$145	$21	$13	$34	$10.68	$0.68	$0.10
Fortified wine onsite†	3	0.1	0.6	0.03	$124	$5	$11	$16	$38.65	$2.45	$0.10
Spirits offsite*	46	2.1	16.1	0.72	$2313	$1116	$210	$1326	$49.97	$1.82	$0.88
Spirits onsite†	15	0.7	5.4	0.24	$2087	$373	$190	$563	$134.73	$4.90	$0.88
RTDs offsite*	209	9.3	8.7	0.39	$2510	$605	$228	$833	$12.02	$3.63	$0.87
RTDs onsite†	118	5.3	4.9	0.22	$2918	$341	$265	$607	$24.78	$7.49	$0.88
Cider offsite*	33	1.5	1.6	0.07	$180	$24	$16	$40	$5.50	$1.39	$0.18
Cider onsite†	11	0.5	0.5	0.02	$152	$8	$14	$22	$14.00	$3.55	$0.18
Total	**2826**	**126.5**	**180.6**	**8.09**	**$31714**	**$5693**	**$2883**	**$8576**			

GST = goods and services tax. RTDs = ready to drink products. * Offsite = sold at bottle shops, supermarkets and alcohol warehouses. † Onsite = sold at licensed premises such as pubs, clubs and restaurants. ◆

that they are under consideration by the Australian Government, or being proposed by parts of the alcohol beverage industry or public health groups in Australia. Four scenarios are modelled in this analysis:

- Replace the wine equalisation tax (WET) on wine and cider with a volumetric excise rate equal to the current excise tax rate applicable to low-strength beer sold offsite.
- Apply an excise tax rate to all beverages equal to a 10% increase in the current excise tax rate applicable to spirits and RTDs.
- Apply an excise tax rate to all beverages, increasing it exponentially by 3.0% for every 1.0% increase in alcohol content above 3.2%.
- Apply a two-tiered volumetric excise tax rate: the first tier applies to beer and wine and increases exponentially by 3.0% for every 1.0% increase in alcohol content above 3.2%; the second tier applies the current excise tax rate applicable to spirits and RTDs.

Economic modelling

Detailed methods are provided in the Appendix (online at mja.com.au). Briefly, the economic modelling considers the extent to which each taxation scenario affects price, consumption and subsequent taxation revenue. Base-case estimates were derived using a combination of data sources. Taxation and duty levies imposed on alcoholic drinks were obtained from Euromonitor International.[9] Taxation revenue related to sales of beer and wine was sourced from the federal Budget, while revenue received from the sales of spirits was calculated using Euromonitor International sales data.[9] Information on annual volume, average value and price of all alcoholic beverages (sold onsite and offsite) were sourced from Euromonitor International. Although the current taxation regime categorises beer into three categories of low, mid and heavy strength, our modelling is based on heavy- and low-strength beer (ie, combined low- and mid-strength) with the excise and subsequent onsite or offsite discounts based on the weighted averages (in volume) of mid- and low-strength beers. We used estimates of price elasticity derived by Purshouse et al to explore variations in consumption patterns as a consequence of varying beverage prices.[10]

Epidemiological modelling

The method we used to model the taxation scenarios is based on the ACE (Assessing the Cost Effectiveness)-Alcohol project. The method and several applications are reported in detail elsewhere[7,8] and in the Appendix. Briefly, using a health sector perspective, health outcomes were evaluated in disability-adjusted life-years (DALYs) using a multistate, multiple-cohort life-table model to determine changes in incidence, prevalence and mortality of alcohol-related diseases and injuries due to each scenario. Cost-effectiveness ratios were derived from cost and health outcomes measured over the lifetime of the Australian population in the baseline year of 2009. Future costs and health outcomes were discounted at 3% per annum.

Results

Base case

Box 1 provides data by alcoholic beverage on annual quantity of alcohol consumed; total value of sales; excise, goods and services tax (GST) and total tax collected; price per litre, price and taxation per standard drink.

The base-case results indicate that 2.83 million litres of alcohol were consumed. Based on average alcohol content levels, per capita consumption of pure alcohol was 8.09 litres per person. High-strength beer was the most common alcoholic beverage consumed; 1.46 million litres (or 52% of all alcohol) were sold offsite and 0.34 million litres (or 12% of all alcohol) were sold onsite.

2 Health and economic impacts of revising current alcohol excise taxation, using 2010 sales data and taxation rates as the base case

Scenario	Annual quantity consumed, '000s litres	Change in quantity consumed (from base case)	Total annual tax collected, $millions	Change in total tax collected (from base case)	Mean DALYs averted* (95% UI)	Cost offsets, $millions* (95% UI)	Net cost, $millions* (95% UI)
Base case	2826	0	$8 576	0	–	–	–
Replace the WET on wine and cider with a volumetric excise rate equal to the current excise tax rate applicable to low-strength beer sold offsite	2790	– 1.3%	$9 899	15.4%	59 000 (48 000 to 71 000)	– $840 (– $1200 to – $530)	– $820 (– $1200 to – $510)
Apply an excise tax rate to all beverages equal to a 10% increase in the current excise tax rate applicable to spirits and RTDs	2528	– 10.6%	$12 848	49.8%	220 000 (180 000 to 270 000)	– $3200 (– $4600 to – $2000)	– $3100 (– $4600 to – $2000)
Apply an excise tax rate to all beverages, increasing it exponentially by 3.0% for every 1.0% increase in alcohol content above 3.2%	2786	– 1.4%	$9 951	16.0%	110 000 (87 000 to 130 000)	– $1500 (– $2200 to – $960)	– $1500 (– $2100 to – $940)
Apply a two-tiered volumetric excise tax rate: first tier applies to beer and wine and increases exponentially by 3.0% for every 1.0% increase in alcohol content above 3.2%; second tier applies current excise tax rate applicable to spirits and RTDs	2778	– 1.7%	$10 272	19.8%	83 000 (68 000 to 99 000)	– $1200 (– $1700 to – $750)	– $1200 (– $1700 to – $730)

DALY = disability-adjusted life-year. RTDs = ready-to-drink products. 95% UI = uncertainty interval around the cost and DALY estimates, derived from multivariate sensitivity analysis propagating uncertainty around cost inputs, elasticity estimates, relative risks of disease outcomes and the prevalence of alcohol consumption. The intervals are bounded by the 2.5 and 97.5 centile values of 2000 iterations. WET = wine equalisation tax. * Over the lifetime of the population. ◆

The value of sales for alcoholic beverages in 2010 was $31.7 billion; high-strength beer accounted for $13.1 billion (or 41% of total sales) with offsite beer sales accounting for $7.7 billion (or 24% of total sales) and onsite beer sales accounting for $5.4 billion (or 17% of total sales).

Total taxation (excise + GST) revenue collected from the consumption of alcohol was $8.6 billion; high-strength beer sold offsite accounted for $2.8 billion (or 32% of total revenue) and spirits sold offsite at $1.3 billion (or 15% of total revenue).

The price per litre of alcohol ranged from a low of $4.49 for low-strength beer sold offsite to a high of $134.73 for spirits sold onsite. When converted to a price per standard drink (based on average alcohol content levels) RTDs sold onsite were the most expensive, at $7.49 per standard drink.

Significant discrepancies in the amount of excise tax per standard drink were identified, with amounts ranging from a low of $0.10 per standard drink for fortified wine to a high of $0.88 for RTDs sold onsite and spirits (Box 1). The largest discrepancies are found among the wine-based products that are subject to the WET.

Summary of modelled taxation scenarios

Box 2 provides a summary of results for each modelled taxation scenario. The key finding suggests that any of these variations to current taxation of alcohol beverages is a cost-effective health care intervention. All the modelled scenarios are classified as being dominant in comparison to current practice (ie, they save money and are more effective in reducing alcohol-related harm compared with what is currently being achieved).

Applying a universal tax rate on alcoholic beverages equivalent to a 10% increase in the current excise applicable to spirits and RTDs was the scenario that produced the greatest health and economic gains. Overall alcohol consumption would decrease by 10.6%, resulting in 220 000 DALYs being averted. The amount of alcohol-related disease and injury prevented in this scenario would save the health system $3.2 billion over the lifetime of the population. The cost of implementing this scenario ($22 million) is only a fraction of the savings achieved, which underscores how highly cost-effective this scenario would be.[7] This scenario, however, does not address the inefficiencies of the current taxation system — it merely increases the tax for each beverage. Furthermore, under this scenario, overall taxation revenue was estimated to increase by 50% or an additional $4.3 billion per year.

Removing the WET and applying an excise rate on wine and spirits equal to low-strength beer sold offsite would reduce overall alcohol consumption by 1.3%, resulting in 59 000 DALYs being averted at a cost saving of $820 million. Overall taxation revenue would increase by 15% or an additional $1.3 billion per year.

Discussion

Our analysis has modelled a limited number of alcohol taxation scenarios that may be considered politically feasible. Both the National Preventative Health Taskforce and the Henry Review recommended taxing alcohol according to alcohol content. Our analysis takes these recommendations one step further by exploring subtle but important variations of volumetric taxation. Our modelling suggested that replacing the WET with a volumetric tax, alone, would increase taxation revenue by $1.3 billion, reduce overall alcohol consumption by 1.3%, significantly reduce alcohol related harm and save lives. A tiered volumetric approach will lead to even greater taxation receipts and higher falls in alcohol consumption.

Alcohol-related harm is now a major public health issue in Australia and globally. Given the substantial external costs associated with alcohol misuse, it has been argued that governments should be more proactive in developing an appropriate policy response to reduce this burden.[4,11] The most cost-effective strategy that governments are able to adopt is changing the taxation system so that alcohol products are taxed according to alcohol content. Health, tax and economic experts all agree that Australia's current alcohol taxation is incoherent and that reform is needed.[5,6,11]

Although the modelling approach is documented in the Appendix and a detailed consideration of the strengths and limitations is provided elsewhere, there are several limitations worth noting. Our estimates of price elasticity rely on United Kingdom data.[10] Although these estimates are based on the latest evidence, there may be variations in Australian consumers' responsiveness to price changes. Nevertheless, in the absence of comparable Australian data, the UK estimates remain the most appropriate. Our modelling also assumes an immediate reversal of risk for alcohol-related cancers as a consequence of lowering consumption. Adopting a lagged impact may be more appropriate, but the implication on overall results is likely to be minimal, given that cancers represent a small component of total health outcomes.

The political will of government to reform the current taxation of alcoholic beverages has been questioned, and it has been suggested that the government has a direct conflict of interest in alcohol policy, given its reliance on taxation revenue.[12] Data from our analysis indicate that in 2010 the Australian Government collected close to $8.6 billion from the excise on alcohol products.

Worryingly, government has also been shown to put the alcohol industry's interests ahead of public health. Despite the Henry Review recommending reform to the WET,[6] the government announced that it would not do so "in the middle of a wine glut and where there is an industry restructure underway".[13]

Overall, our findings suggest that by reassessing the rates of alcohol taxation, the Australian Government is able to improve health, reduce health care costs and substantially increase the amount of alcohol excise tax collected. This research clarifies what the evidence base can tell us about outcomes of specific policies and highlights the need for urgent action on alcohol taxation reform in Australia.

Acknowledgements: We acknowledge the funding provided for our research by the Victorian Health Promotion Foundation (VicHealth).

Competing interests: No relevant disclosures.

Received 6 May 2013, accepted 27 Sep 2013.

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