Strengthening the evidence base for volumetric taxation of alcohol

The health and economic impacts of alternative alcohol taxation regimes in Australia

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VicHealth

Published in December 2011 by the
Victorian Health Promotion Foundation (VicHealth)

PO Box 154 Carlton South, VIC 3053 Australia

ISBN: 978-1-921822-41-4
Publication number: K-031-ATUV

Suggested citation
Strengthening the evidence base for volumetric taxation of alcohol. The health and economic impacts of alternative alcohol taxation regimes in Australia. Victorian Health Promotion Foundation (VicHealth), Carlton, Australia.

Strengthening the evidence base for volumetric taxation of alcohol in Australia

A report prepared for the Victorian Health Promotion Foundation into the health and economic impacts of alternative alcohol taxation regimes in Australia

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Acknowledgement

Funding for this research was provided by the Victorian Health Promotion Foundation (VicHealth).

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Summary

Introduction

This research has been undertaken with the objective of informing the development and implementation of a proposed alcohol taxation regime in Australia. From a public health and economic perspective, the current alcohol taxation regime in Australia is significantly flawed. The National Preventative Health Taskforce reported that while there are some positive aspects to the current regime, such as the relatively lower rate of tax on low-alcohol beer, there are large inconsistencies in the way different alcohol products are taxed; products are not consistently taxed according to their alcohol content level, nor their propensity to cause harm (Preventative Health Taskforce 2009).

This report seeks to strengthen the evidence base for volumetric taxation of alcohol in Australia by addressing four aims:

1. Undertaking economic and epidemiological modelling on a range of alcohol beverage taxation scenarios to examine the impact on alcohol consumption, taxation revenue, price changes, disability-adjusted life year averted (DALYs) and healthcare costs.
2. Examining the evidence relating to the link between alcohol products deemed to be of higher risk, or creating additional harms in the community.
3. Examining the evidence related to the minimum price (or floor price) of alcohol products, with a particular focus on recent UK initiatives.
4. Examining the evidence related to hypothecation and the potential to prevent and reduce alcohol-related harm in the community.

Method

Scenarios

Seven different alcohol beverage types are included in the scenario modelling, of which each is further broken down into offsite (bottle shops, supermarkets and alcohol warehouses) or onsite (i.e. licensed premises, such as pubs, clubs and restaurants) beverage consumption:

- low-strength beer
- high-strength beer
- wine
- fortified wine
- straight spirits
- alcopops (also referred to as ‘ready-to-drink beverages’)
- cider.

A total of 13 scenarios are modelled:

Scenario 1: Applying a universal excise tax rate on alcoholic beverages equal to the current excise rate applicable to high-strength beer sold offsite, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 2: Applying a universal tax rate on alcoholic beverages equal to the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 3: Applying a universal tax rate on alcoholic beverages equivalent to a 10 per cent increase in the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 4: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (except spirits and alcopops) equal to the current excise applicable to high-strength beer sold offsite; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 5: Tiered tax rate, with the excise rate increasing exponentially by 1 per cent for every per cent increase in alcohol content above 3.2 per cent, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits and alcopops.

Scenario 6: Tiered tax rate, with the excise rate increasing exponentially by 2 per cent for every per cent increase in alcohol content above 3.2 per cent, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits and alcopops.

Scenario 7: Tiered tax rate, with the excise rate increasing exponentially by 3 per cent for every per cent increase in alcohol content above 3.2 per cent, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits and alcopops.

Scenario 8: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 3 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 9: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 5 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 10: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 7 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 11: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 10 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 12: Two-tiered tax system. The first tier adopts the current excise rate on low-strength beer, and varies taxation rates for higher alcohol-content beverages, such that total taxation receipts remains unchanged from base case; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 13: Removing the current wine equalisation tax (WET), and applying an excise rate equivalent to low-strength offsite beer for these beverages subject to the WET.

Modelling

The methodology used to model the taxation scenarios is based on the framework developed for the Alcohol Education Rehabilitation Foundation-funded project entitled "ACE–Alcohol" (assessing the cost-effectiveness of interventions to reduce the burden of harm from alcohol misuse) (Doran et al. 2008). The ACE–Alcohol method and several applications are reported in detail in Doran et al. (2008), Cobiac et al. (2009), Byrnes et al. (2010), Doran et al. (2010) and Hall et al. (2010).

Taxation revenue for beer excise and the WET were sourced from the Federal Budget, while excise spirits were calculated from the Euromonitor data. Information on volume, value and price of all alcoholic beverages were sourced from Euromonitor. Published estimates of price elasticity were obtained for beer, wine, alcopops and spirits for onsite and offsite consumption, and for two separate drinker risk profiles (moderate and hazardous) (Purshouse et al. 2010). The percentage change in onsite and offsite consumption is calculated for both moderate drinkers and for heavy and hazardous drinkers using the relevant price elasticities for each class of drinker. Although the current taxation regime categorises beer into three categories of low , mid and heavy strength, due to data constraints, our modelling is based on low- (i.e. combined low and mid strength) and high-strength beer, with the excise and subsequent onsite/offsite discounts based on the weighted averages (in volume) of low- and mid-strength beers.

Results

Alcohol economic and epidemiological taxation modelling

The key finding from this research suggests that any variation to current rates of alcohol excise is a cost-effective healthcare intervention (Table A). All the modelled scenarios are cost-effective, and are classified as being dominant in comparison to current practice (i.e. they save more money and are more effective in reducing alcohol-related harm than what is

currently being achieved). By reassessing the rates of alcohol excise, the government is able to improve health, avert healthcare costs and increase the amount of alcohol excise tax collected.

Scenario 3 (applying a universal tax rate on alcoholic beverages equivalent to a 10 per cent increase in the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits) appears to be the preferred option. Overall alcohol consumption would decrease by 10.6 per cent, 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 a year. 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. Furthermore, under this scenario, overall taxation revenue is estimated to increase by 49.8 per cent, or an additional $4.27 billion per year. This scenario, however, does not address the inefficiencies of the current taxation system; it merely increases the tax for each beverage. Further, this scenario is not conducive to the National Alliance for Action on Action (NAAA) principles of alcohol reform in Australia, namely that the approach to alcohol taxation should be volumetric, with tax increasing for products with higher alcohol volumes, and changes to tax should not be designed to produce a decrease in the price of alcohol products, other than for low-alcohol products.

The most effective scenario, consistent with NAAA principles, is scenario 11: a two-tiered tax system, with the first tier applying a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 10 per cent for every per cent increase in alcohol content above 3.2 per cent, and the second tier applying the current excise applicable to spirits and alcopops. Overall alcohol consumption would decrease by 3 per cent, resulting in 140,000 DALYs being averted. The amount of alcohol-related disease and injury prevented in this scenario would save the health system $2 billion a year, and overall receipts from alcohol excise would increase by 32.4 per cent, or an additional $2.78 billion per year. This scenario keeps the cost of a low-alcohol standard drink at the same level, with a subsequent increase in higher alcohol content beverages.

The results for scenarios 1 and 13 are also worth noting. Scenario 1, which applies a universal excise tax rate on alcoholic beverages equal to the current excise rate applicable to high-strength beer sold offsite, is the model of volumetric taxation recommended in the Henry Review (The Treasury 2009a). However, scenario 1 does not conform to NAAA principles, given the substantial reductions in the price of spirits and alcopops. Scenario 13 involves a removal of the current WET, and applies an excise rate equivalent to low-strength offsite beer for these beverages subject to the WET. This scenario would reduce overall alcohol consumption by 1.3 per cent, avert 59,000 DALYs, save the health system $820 million a year and increase receipts from alcohol excise by an additional $1.3 billion per year. Although this scenario might not be readily accepted by the wine industry, the wine industry is currently in a state of transition and any changes to the WET could be factored into their product portfolio. Further, any additional adjustments to the excise rate applied to alcohol content of wine might create an incentive for the wine industry to diversify their portfolio into the manufacture of products with a low alcohol content.

Table A: Summary of results for scenarios 1–13

Scenario	Mean DALYs averted	Cost offsets ($million)	Net costs ($million)	Quantity consumed (/1,000 litres)	Change in quantity consumed (from base case)	Total tax collected ($m)	Change in total tax collected (from base case)
Base case				2,826	0%	$ 8,576	0%
Scenario 1	18,000 (14,000 – 21,000)	-$250 (-$370 to -$150)	-$230 (-$350 to -$130)	2,810	-0.6%	$ 8,933	4.2%
Scenario 2	180,000 (150,000 – 220,000)	-$2,600 (-$3,800 to -$1,700)	-$2,600 (-$3,700 to -$1,600)	2,583	-8.6%	$ 12,195	42.2%
Scenario 3	220,000 (180,000 – 270,000)	-$3,200 (-$4,600 to -$2,000)	-$3,100 (-$4,600 to -$2,000)	2,528	-10.6%	$ 12,848	49.8%
Scenario 4	54,000 (44,000 – 65,000)	-$760 (-$1100 to -$490)	-$740 (-$1,100 to -$470)	2,795	-1.1%	$ 9,703	13.2%
Scenario 5	33,000 (27,000 – 40,000)	-$470 (-$700 to -$300)	-$450 (-$670 to -$270)	2,812	-0.5%	$ 9,138	6.6%
Scenario 6	65,000 (53,000 – 78,000)	-$920 (-$1,300 to -$590)	-$900 (-$1,300 to -$570)	2,800	-0.9%	$ 9,578	11.7%
Scenario 7	110,000 (87,000 – 130,000)	-$1,500 (-$2,200 to -$960)	-$1,500 (-$2,100 to -$940)	2,786	-1.4%	$ 9,951	16.0%
Scenario 8	83,000 (68,000 – 99,000)	-$1,200 (-$1,700 to -$750)	-$1,200 (-$1,700 to -$730)	2,778	-1.7%	$ 10,272	19.8%
Scenario 9	100,000 (85,000 – 120,000)	-$1,500 (-$2,100 to -$940)	-$1,500 (-$2,100 to -$920)	2,763	-2.2%	$ 10,558	23.1%
Scenario 10	120,000 (98,000 –140,000)	-$1,700 (-$2,500 to -$1,100)	-$1,700 (-$2,500 to -$1,000)	2,752	-2.6%	$ 10,859	26.6%
Scenario 11	140,000 (110,000 – 170,000)	-$2,000 (-$2,900 to -$1,200)	-$2,000 (-$2,900 to -$1,200)	2,742	-3.0%	$ 11,354	32.4%
Scenario 12	9,900 (7,300 – 13,000)	-$140 (-$220 to -$77)	-$120 (-$200 to -$55)	2,921	3.4%	$ 8,576	0%
Scenario 13	59,000 (48,000 – 71,000)	-$840 (-$1,200 to -$530)	-$820 (-$1,200 to -$510)	2,790	-1.3%	$ 9,899	15.4%

What is the link between alcohol products and harm?

A search was undertaken for published articles investigating the different degrees of harm associated with the consumption of different alcoholic beverage types. Eleven electronic databases were interrogated: Australian Medical Index, ABI/INFORM Global, Medline, Embase, Project Cork, PsycINFO, CINAHL, DRUG, Science Direct, Scopus and Web of Science. The search was limited to articles published from 2000 to 2011. Close to 100 published articles were identified, with 36 being used in this review: 12 for cancer, five for cardiovascular or coronary heart disease, five for cognitive function and dementia, two for homicide, nine for mortality and three for suicide. In spite of the methodological variations in the study design, target sample and definition of quantity of alcohol consumed, the key finding from this synthesis of the evidence is that drinking spirits or beer appears to be associated with a higher risk of harm, while wine consumption might have a protective effect when consumed light to moderately. However, the evidence base is mixed and requires further investigation to reach a more definite conclusion.

What is minimum pricing and can it be used in Australia?

The concept of a minimum price for alcohol is to set a floor price, such that the price per standard drink within a particular sale cannot fall below a certain limit. Such a policy is currently being explored as an option to deal with alcohol-related harm in Scotland and in the wider UK (Ludbrook 2009). The policy is likely to have a larger impact within the offsite alcohol sector, where generally alcohol products are relatively cheaper compared to the

onsite sector. A minimum price for alcohol is likely to impact, in particular, on cheap, high-strength alcohol products compared to other more expensive, low-strength alcohol products.

A floor price for alcohol is likely to have a greater impact on the risky consumption of alcohol compared to across-the-board increases in taxes. This is because with an increase in taxes, high-quantity alcohol consumers can normally shift their consumption from more expensive to cheaper alcohol products, rather than reduce their consumption of alcohol (Meier et al. 2009); however, where a minimum price for alcohol exists, there will be no cheaper alcohol products available. Given that a minimum price is likely to reduce the cost difference between offsite and onsite sales, it is likely to reduce the extent to which individuals consume large amounts of cheap offsite alcoholic products at home before going out to onsite sale locations, where they purchase fewer units. A minimum price policy is likely to also have a larger impact on the young, including underage drinkers, who generally have less disposable income, are more likely to purchase alcohol for its intoxicating properties, rather than its quality, and are more likely to purchase alcohol from offsite premises, rather than onsite locations (Hunt et al. 2010).

The exact response to a floor price for alcohol by Australian consumers and those alcohol producers and sellers within the Australian alcohol market is unknown, and thus, also unknown is the exact impact of minimum pricing on risky consumption and alcohol-related harms within the Australian context. While an extensive amount of research is currently taking place to further explore the impact within the UK context, more research is needed to explore the impact of minimum pricing for alcohol within the Australian context.

What is hypothecation, and can it be implemented to prevent and reduce alcohol-related harm in the community

Hypothecation, in the context of taxation, is the dedication of the revenue of a specific tax for a specific expenditure purpose. Hypothecated taxes for health often come in the form of so-called sin taxes. These are levies on the consumption of products that are harmful to health, such as tobacco and alcohol. Sin taxes raise funds for health spending, and discourage health-damaging behaviour. Victoria implemented the world's first sin tax that was hypothecated for health in 1987. Tobacco control legislation added a 5 per cent levy on tobacco products, and the revenue was then used to fund VicHealth, an independent health-promotion foundation. Coupled with other legislation at the time that increased the price of cigarettes (through taxation) and banned most tobacco advertising, VicHealth was able to use the hypothecated funds to buy out all tobacco industry sponsorships of the arts and sports. The success of the Victorian example resulted in Western Australia and South Australia also hypothecating a proportion of funds accrued from tobacco taxation receipts into foundations established specifically to promote and fund health-promotion activities. Other countries to now fund health promotion from hypothecated taxes include Finland, the Republic of Korea, Portugal and Thailand.

The Preventative Health Taskforce recommends that a proportion of revenue from alcohol taxation be directed towards initiatives that prevent alcohol-related societal harm. The findings from our work suggest that any adjustment to the current rate of alcohol excise is cost-effective in terms of reducing the burden of alcohol-related harm and increasing the

amount of taxation revenue collected. However, research conducted by Doran et al. (2008), and published in Cobiac et al. (2009), emphasise that more than 10 times the amount of health gain could be achieved if an optimal package of interventions, in addition to taxation, was implemented. This optimal package would include advertising bans, licensing controls, brief intervention by general practitioners, drink-driving campaigns, random breath testing and residential treatment for alcohol dependence. The cost of this optimal package is estimated at close to $71 million, which is equivalent to a levy of 1.25 per cent of current alcohol excise taxation receipts. A 5 per cent levy would be equivalent to $285 million per annum, and would fund the implementation of a broader range of interventions.

Recommendations

This report supports the recommendation of the National Preventative Health Taskforce and the Henry Review towards taxing alcohol according to alcohol content.

This report recommends a removal of the WET. A removal of the current WET (and applying an excise rate equivalent to low-strength offsite beer for these beverages subject to the WET) will reduce overall alcohol consumption, improve health and increase the amount of alcohol excise taxation revenue by $1.3 billion per year.

Further, this report recommends a two-tiered tax system, with the first tier applying a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 10 per cent for every per cent increase in alcohol content above 3.2 per cent, and the second tier applying the current excise applicable to spirits and alcopops. Such a taxation system would: reduce overall alcohol consumption by 3 per cent, avert up to 140,000 DALYs, save the health system close to $2 billion each year and increase the amount of alcohol excise receipts by an additional $2.78 billion each year.

This report recommends further research to be commissioned to comprehensively evaluate the relationship between alcohol-related harm by beverage type. To date, the evidence base is mixed, lacks methodological consistency and requires further investigation to reach a more definite conclusion.

This report recommends that the Australian Government should follow the UK's lead and set a minimum price per standard of alcoholic drink. A floor price for alcohol is likely to have a greater impact on underage and binge drinking, but further research is required to quantify this impact. Further refinements in the taxation system are also required before the Australian Government could consider a minimum price. A more equitable and efficient taxation system, underpinning a minimum price, requires the removal of the WET, adjusting excise rates to reflect alcohol content and a removal of other distortions, such as duty-free and onsite discounts.

This report recommends hypothecation of alcohol excise tax revenues for alcohol control, health programs or other dedicated purposes. The levy should be set at 5 per cent, and indexed annually.

Technical report

Background

This research builds upon a larger project called 'ACE–Alcohol', which aimed to assess the cost-effectiveness (ACE) of interventions to reduce alcohol-related harm in Australia (Doran et al. 2008). The ACE–Alcohol research contextualised results from a recent World Health Organization study to the Australian setting, using, where possible, Australian data on costs, effectiveness of interventions and health outcomes.

For this research project, a technical advisory panel, comprising representatives of VicHealth and the Public Health Association of Australia, assisted in the identification of the taxation scenarios modelled in the research.

International reviews have consistently found 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 (Babor et al. 2010). Even small increases in the price of alcohol can have a significant impact on consumption and harm (Chikritzhs et al. 2005). However, despite its reported effectiveness, taxation as a strategy to reduce alcohol-related harm has been under-utilised in Australia.

From a public health and economic perspective, the current alcohol taxation regime in Australia is significantly flawed. A recent economic analysis of the current alcohol taxation system in Australia concluded that, overall, it has "no logic as a mechanism to correct for market failures" (Freebairn 2010). The National Preventative Health Taskforce reported that while there are some positive aspects to the current regime, such as the relatively lower rate of tax on low-alcohol beer, there are large inconsistencies in the way different alcohol products are taxed; products are not consistently taxed according to their alcohol content level, nor their propensity to cause harm (Preventative Health Taskforce 2009). For instance, wine is one of the most preferred types of drinks among heavy drinkers in Australia (Srivastava & Zhao 2010), yet a large proportion of wine (e.g. cask wine) is taxed at a relatively low rate compared to beer and spirits, and it is also taxed at a relatively low rate by international standards (Anderson 2010).

The Federal Treasury's recent review of Australia's tax system (the 'Henry Review') concluded that "current taxes on beer, wine and spirits are incoherent" (The Treasury 2009a). The report recommended that "if alcohol taxes are to be effective in reducing social harm, the taxation of beer, wine and spirits needs to be reformed. The ideal tax structure would be a volumetric tax on all alcoholic beverages, set to balance the reduction in spillover costs of alcohol abuse with the cost of taxation on non-abusive consumers, and recognise social benefits of lower-strength products" (The Treasury 2009a). The report also recommended that "urgent structural reforms are needed to remove specific exemptions or concessions for certain forms of alcohol most open to severe abuse, including cheap wine" (The Treasury 2009a).

In addition to introducing a volumetric tax on alcohol, there is also increasing recognition in overseas markets of the need to regulate the minimum price (or floor price) of alcohol products as a way of preventing harmful consumption (Purshouse et al. 2010). In the Australian context, the Henry Review reports that while volumetric taxation would provide a basis for a floor price for alcohol, some alcohol could still sometimes be sold below cost or given away, and the transition to a volumetric system might result in some products dropping in price (The Treasury 2009a). Regulating the minimum price of alcohol in Australia might therefore be an important augmentation to a new volumetric taxation regime.

It is important to acknowledge that regardless of the structure of the alcohol taxation regime and pricing regulations, current or future, these are only one part, albeit an essential part, of a comprehensive strategy to reduce alcohol-related harm. Other complementary policy interventions, such as controls on the supply of alcohol, regulating alcohol marketing and promotions, enforcing drink-driving laws and health service interventions are required to maximise the effectiveness of taxation and pricing measures.

Objectives

This research has been undertaken with the objective of informing the development and implementation of a proposed alcohol taxation regime in Australia.

The range of taxation scenarios that have been modelled were selected on the basis that they are

- under consideration by the Australian Government, or
- being proposed by parts of the alcohol beverage industries in Australia, or
- would achieve improved public health outcomes in the Australian community.

With regard to the latter, a number of public health and economic principles were used in developing some of the scenarios and/or elements thereof. These principles have been consolidated by the NAAA. The NAAA is a new national coalition of health and community organisations from across Australia that has been formed with the goal of reducing alcohol-related harm. The formation of the NAAA represents the first time such a broad-based alliance has come together to pool their collective expertise around what needs to be done to address Australia's drinking problems. The NAAA aims to put forward evidence-based solutions, with a strong emphasis on action. The NAAA is not industry funded.

The NAAA has developed principles for reform of the alcohol taxation system in Australia, with the primary objective of reducing harm and promoting a safer drinking culture. These principles are:

1. Taxation of alcohol should be based on the principle that alcohol is no ordinary commodity. It is a product responsible for major harms in our community.
2. Alcohol taxation is one of the most effective ways to reduce alcohol consumption and associated harms, and is especially effective if part of a broad-based health strategy.
3. The approach to alcohol taxation should be volumetric, with tax increasing for products with higher alcohol volumes.

4. The alcohol taxation system should have the capacity to target alcohol products deemed to be of higher risk, or creating additional harms in the community.
5. There should be an overall increase in alcohol taxation.
6. The real price of alcohol should increase over time.
7. Changes to tax should not be designed to produce a decrease in the price of alcohol products, other than for low-alcohol products.
8. To complement volumetric tax on alcohol, there is also a need to regulate the minimum price (or floor price) of alcohol products.
9. A proportion of alcohol taxation revenue should be hypothecated to prevent and reduce alcohol-related harm in the community.

Aim

This report seeks to strengthen the evidence base for the volumetric taxation of alcohol in Australia by addressing four aims:

1. Undertaking economic and epidemiological modelling on a range of alcohol beverage taxation scenarios to examine the impact on alcohol consumption, taxation revenue, price changes, DALYs and healthcare costs.
2. Examining the evidence relating to the link between alcohol products deemed to be of higher risk, or creating additional harms in the community.
3. Examining the evidence related to the minimum price (or floor price) of alcohol products, with a particular focus on recent UK initiatives.
4. Examining the evidence related to hypothecation and the potential to prevent and reduce alcohol-related harm in the community.

Method

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Seven different alcohol beverage types are included in the scenario modelling, of which each is further broken down into offsite (bottle shops, supermarkets and alcohol warehouses) or onsite (i.e. licensed premises, such as pubs, clubs and restaurants) beverage consumption:

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A total of 13 scenarios are modelled:

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Scenario 2: Applying a universal tax rate on alcoholic beverages equal to the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 3: Applying a universal tax rate on alcoholic beverages equivalent to a 10 per cent increase in the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 4: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (except spirits and alcopops) equal to the current excise applicable to high-strength beer sold offsite; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 5: Tiered tax rate, with the excise rate increasing exponentially by 1 per cent for every per cent increase in alcohol content above 3.2 per cent, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits and alcopops.

Scenario 6: Tiered tax rate, with the excise rate increasing exponentially by 2 per cent for every per cent increase in alcohol content above 3.2 per cent, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits and alcopops.

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Scenario 8: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 3 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

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Scenario 12: Two-tiered tax system. The first tier adopts the current excise rate on low-strength beer, and varies taxation rates for higher alcohol-content beverages, such that total taxation receipts remains unchanged from base case; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits.

Scenario 13: Removing the current WET, and applying an excise rate equivalent to low-strength offsite beer for these beverages subject to the WET.

Epidemiological modelling

The methodology used to model the taxation scenarios is based on the framework developed for the Alcohol Education Rehabilitation Foundation funded project entitled "ACE–Alcohol" (Doran et al. 2008). ACE–Alcohol was part of a larger priority-setting exercise funded by the National Health Medical Research Council entitled "ACE–Prevention" (assessing the cost-effectiveness of interventions to reduce the burden of harm from non-communicable diseases). ACE–Prevention was led by Professor Vos from the University of Queensland, and Professor Carter from Deakin University. Further details of the report and recommendations of ACE–Prevention can be found at: http://www.sph.uq.edu.au/bodce-ace-prevention.

The ACE–Alcohol method and several applications are reported in detail in Doran et al. (2008), Cobiac et al. (2009), Byrnes et al. (2010), Doran et al. (2010) and Hall et al. (2010). ACE–Alcohol evaluated the cost-effectiveness of eight different interventions for reducing harm attributable to alcohol consumption from an Australian health sector perspective. Health outcomes were evaluated in DALYs using a multistate, multiple cohort life table approach to determine changes in incidence, prevalence and mortality of alcohol-related diseases and injuries due to each intervention. Diseases evaluated in the model include ischaemic heart disease, ischaemic stroke, hypertensive heart disease, inflammatory heart disease, pancreatitis, cirrhosis, alcohol dependence and gallbladder and bile duct disease, as well as cancer of the breast (in women), mouth and oropharynx, oesophagus, liver and larynx. Injuries include road traffic accidents, falls, fires, burns and scalds, drowning, machinery accidents, suffocation and foreign bodies, suicide and self-inflicted injuries, and homicide and violence.

Population and all-cause mortality, by age and sex, are derived from Australian Bureau of Statistics data (2009a,b). Incidence and case fatality, by age and sex, are derived from Australian Burden of Disease study data and trend analyses (Begg et al. 2008a,b). Average daily consumption of alcohol and prevalence of abstinent, low, hazardous or harmful levels

of drinking, by age and sex, are derived from National Health Survey 2008 data, with adjustment for per capita consumption based on national sales data (Australian Bureau of Statistics 2009c; Chikritzhs et al. 2010; Rehm et al. 2010). These data are provided in Tables 1 and 2, and Figure 1.

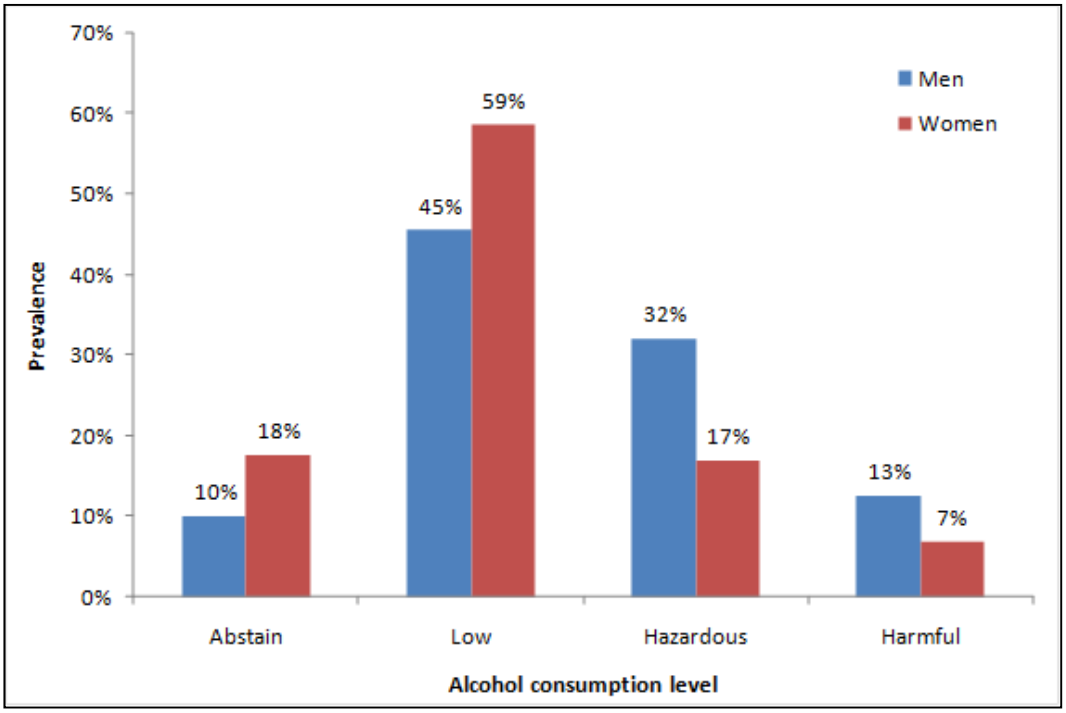
Table 1: Levels of alcohol consumption based on the average number of standard drinks consumed per day (one standard drink = 10 grams of alcohol)

	Abstain	Low	Hazardous	Harmful
Men	0.00–0.25	0.26–4.00	4.01–6.00	6.01+
Women	0.00–0.25	0.26–2.00	2.01–4.00	4.01+

Table 2: Mean daily alcohol consumption (in grams) of Australian men and women aged 18+ years, by level of alcohol consumption

	Abstain	Low	Hazardous	Harmful
Men	1.80	10.00	35.00	99.00
Women	1.70	9.20	27.00	65.00

Figure 1: Prevalence of alcohol consumption for all men and women aged 18+ years



The costs of treating each case of disease or injury, by age and sex, are derived from Disease Costs and Impacts Study data, adjusted to 2009 dollars using health system deflators (Australian Institute of Health and Welfare 2001; 2009). Intervention costs are derived from the World Health Organization costing database (World Health Organization 2009), adjusted to 2009 dollars using the Consumer Price Index (Australian Bureau of Statistics 2009d). The analyses are carried out in Excel (Microsoft Office 2003), using the

add-in tool @Risk (Palisade, version 4.5) for uncertainty analysis. Cost-effectiveness ratios are 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 are discounted at 3 per cent per annum. In ACE–Alcohol, cost-effectiveness ratios were evaluated for each intervention in comparison with current practice, which is equivalent to a 'do nothing' scenario, apart from the current level of intensity of random breath testing. Probabilities of cost-effectiveness were reported against a cost-effectiveness threshold of $50,000 per DALY averted, a threshold used in previous Australian priority-setting studies.

Economic modelling

The current taxation of alcoholic beverages in Australia is complex and inefficient. The only consistency is that all alcohol products are subject to a goods and service tax of 10 per cent. Certain beverages (wine, fortified wine and cider) are subject to an ad valorem tax, while others (beer, spirits and alcopops) are taxed volumetrically. The current value-based tax imposed on wine-based products is referred to as a WET. For wholesale sales, a WET is paid on the selling price (excluding a WET and goods and services tax) of the wine at the last wholesale sale. For untaxed wine sold by retail, a WET is charged on a notional wholesale selling price. The rate of the WET is 29 per cent of the wholesale value. Table 3 provides an overview of variations in excise rates according to beverage type. All beer benefits from a tax-free threshold of 1.15 per cent of alcohol content. Low-alcohol beer sold onsite (i.e. draught beer from a keg) is taxed at a rate 20 per cent lower than beer sold offsite (i.e. beer packaged in cans or bottles). Mid-strength beer sold onsite is taxed at a rate 54 per cent lower than beer sold offsite. Full-strength beer sold onsite is taxed at a rate 70 per cent lower than high-strength beer sold offsite. Spirits and alcopops are taxed at the highest rate ($69.16 per litre of pure alcohol), and brandy is taxed at a slightly lower rate than spirits ($64.57). Alcopops are taxed at the same rate as spirits following the government's equalisation of excise on all spirits-based products in April 2008.

Table 3: Excise tax applied on alcoholic drinks in 2010

Beverage type	**Amount per litre of pure alcohol**
Low-alcohol beer (<3% ABV), and packaged in an individual container not exceeding 48 litres	$ 35.03
Low-alcohol beer (<3% ABV), and packaged in an individual container exceeding 48 litres	$ 6.99
Mid-strength beer (3.01 – 3.5% ABV), and packaged in an individual container not exceeding 48 litres	$ 40.82
Mid-strength beer (3.01 – 3.5% ABV), and packaged in an individual container exceeding 48 litres	$ 21.96
Full-strength beer (>3.5% ABV), and packaged in an individual container not exceeding 48 litres	$ 40.82
Full-strength beer (>3.5% ABV), and packaged in an individual container exceeding 48 litres	$ 28.74
Other excisable beverages not exceeding 10% by volume of alcohol	$ 69.16
Brandy	$ 64.57
Other excisable beverages exceeding 10% by volume of alcohol	$ 69.16

In this analysis, base-case taxation revenue for beer excise and the WET were sourced from the Federal Budget, while excise spirits were calculated from Euromonitor (Euromonitor International 2010). Information on volume, value and price of all alcoholic beverages were sourced from Euromonitor. Euromonitor International is a research organisation that uses a comprehensive and standardised methodology to collect detailed, extensive data on a wide range of topics, including alcohol sales. These data for beer are reported for low-strength (including mid-strength and low-strength) and full strength (heavy) beer. Both onsite (i.e. licensed premises) and offsite (i.e. bottle shops) sales are reported. For the purpose of these analyses, onsite beer is assumed to be 100 per cent keg/draught beer.

Table 4 provides an overview of the underlying data used to establish the base-case scenario, that is, the scenario representing current practice, and which all other scenarios are compared against. Although certain features of this Table are discussed in the next section, assumptions underlying excise tax rates per litre of pure alcohol, average alcohol content and number of standard drinks per litre of alcohol (where a standard drink is equal to 0.001267 litres or 10 grams of pure alcohol) are used to calculate the price per standard drink and excise tax per standard drink. It is important to note that in the following tables, the term 'excise' is used to reflect both actual excise tax and the equivalent tax on those beverages where an ad valorem tax is applied.

Table 4: Underlying data used to establish the base-case scenario

Beverage	Quantity consumed (/1,000 litres)	Average alcohol content	Quantity consumed (/1,000 litres pure alcohol)	Excise rate per litre pure alcohol	Price per litre	Average number of standard drinks per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	127.0	3.2%	4.06	$ 39.12	$ 4.49	2.5	$ 1.78	$ 0.32
Lo-strength beer onsite	29.5	3.2%	0.94	$ 16.68	$ 13.52	2.5	$ 5.36	$ 0.14
High-strength beer -offsite	1,462.7	4.6%	67.29	$ 40.82	$ 5.25	3.6	$ 1.45	$ 0.39
High-strength beer -onsite	340.2	4.6%	15.65	$ 28.74	$ 15.84	3.6	$ 4.36	$ 0.27
Wine -offsite	338.1	12.4%	41.99	$ 13.30	$ 11.55	9.8	$ 1.18	$ 0.17
Wine -onsite	80.0	12.4%	9.93	$ 13.30	$ 41.79	9.8	$ 4.26	$ 0.17
Fortified wine -offsite	13.6	20.0%	2.72	$ 7.64	$ 10.68	15.8	$ 0.68	$ 0.10
Fortified wine -onsite	3.2	20.0%	0.64	$ 7.64	$ 38.65	15.8	$ 2.45	$ 0.10
Spirits -offsite	46.3	34.9%	16.13	$ 69.16	$ 49.97	27.5	$ 1.82	$ 0.88
Spirits -onsite	15.5	34.9%	5.40	$ 69.16	$ 134.73	27.5	$ 4.90	$ 0.88
Alcopops -offsite	208.8	4.2%	8.77	$ 69.16	$ 12.02	3.3	$ 3.63	$ 0.87
Alcopops -onsite	117.8	4.2%	4.94	$ 69.16	$ 24.78	3.3	$ 7.49	$ 0.88
Cider -offsite	32.6	5.0%	1.63	$ 14.54	$ 5.50	3.9	$ 1.39	$ 0.18
Cider -onsite	10.9	5.0%	0.54	$ 14.54	$ 14.00	3.9	$ 3.55	$ 0.18

To explore variations in consumption patterns as a consequence of varying beverage prices, published estimates of price elasticity were obtained for beer, wine, alcopops and spirits for onsite and offsite consumption, and for two separate drinker risk profiles (moderate and hazardous) (Purshouse et al. 2010). The percentage change in onsite and offsite consumption is calculated for both moderate drinkers and for heavy and hazardous drinkers using the relevant price elasticities for each class of drinker.

Alcohol sales data for Australia are not available, with regards to the distribution of sales by price for each class of beverage. As such, sales were assumed to be normally distributed around the average price estimated from the Euromonitor (2010) data, and the average price

elasticity estimates for high- and low-price beverages from Purshouse et al. (2010) were used. These elasticity estimates are provided in Table 5.

Table 5: Own price and cross-price elasticities of alcohol beverages

	Beer		Wine		Spirits		Alcopops	
Moderate	**Offsite**	**Onsite**	**Offsite**	**Onsite**	**Offsite**	**Onsite**	**Offsite**	**Onsite**
Beer -offsite	-0.418	0.03	0.011	0.002	0.006	0.008	0.003	0.006
Beer -onsite	0.013	-0.369	0.011	0.002	0.005	0.015	0.003	0.008
Wine -offsite	0.011	0.024	-0.435	0.001	0.004	0.007	0.002	0.004
Wine -onsite	0.002	0.025	0.005	-0.261	0.004	0.008	0.001	0.005
Spirits -offsite	0.012	0.029	0.011	0.001	-0.517	0.006	0.002	0.004
Spirits -onsite	0.002	-0.009	0.008	0.004	0	-0.98	0.001	0.01
Alcopops -offsite	0.018	0.019	0.004	0.001	0.002	0	-0.321	0.004
Alcopops -onsite	0.003	0.012	-0.001	0.006	0.002	0.011	0.001	-0.321
	Beer		**Wine**		**Spirits**		**Alcopops**	
Hazardous	**Offsite**	**Onsite**	**Offsite**	**Onsite**	**Offsite**	**Onsite**	**Offsite**	**Onsite**
Beer -offsite	-0.573	0.038	0.046	0.004	0.009	0.008	0.001	0.006
Beer -onsite	0.038	-0.582	0.056	0	0.011	0.008	0.002	0.005
Wine -offsite	0.033	0.06	-0.585	0.002	0.01	0.007	0.003	0.004
Wine -onsite	0.008	-0.004	0.006	-0.395	0.009	-0.008	-0.001	0.006
Spirits -offsite	0.014	0.041	0.023	0.003	-0.635	-0.001	0	0.001
Spirits -onsite	0.023	0.002	0.013	0.012	-0.003	-1.993	-0.001	-0.01
Alcopops -offsite	-0.009	0.008	0.021	0	0.002	0.011	-0.399	0
Alcopops -onsite	0.006	0.017	0.007	0.008	0	0.017	0.001	-0.399

Australian estimates of onsite and offsite alcohol sales by beverage class were provided by Euromonitor (2010). Onsite and offsite alcohol sales for each beverage class were then estimated for moderate and hazardous drinkers by applying the proportion of average alcohol consumption by hazardous drinkers. The proportion of alcohol consumption by hazardous drinkers for Australia was estimated using the following equation:

$$h = q_H \times p_H \,/\, [(q_H \times p_H) + (q_M \times p_M)],$$

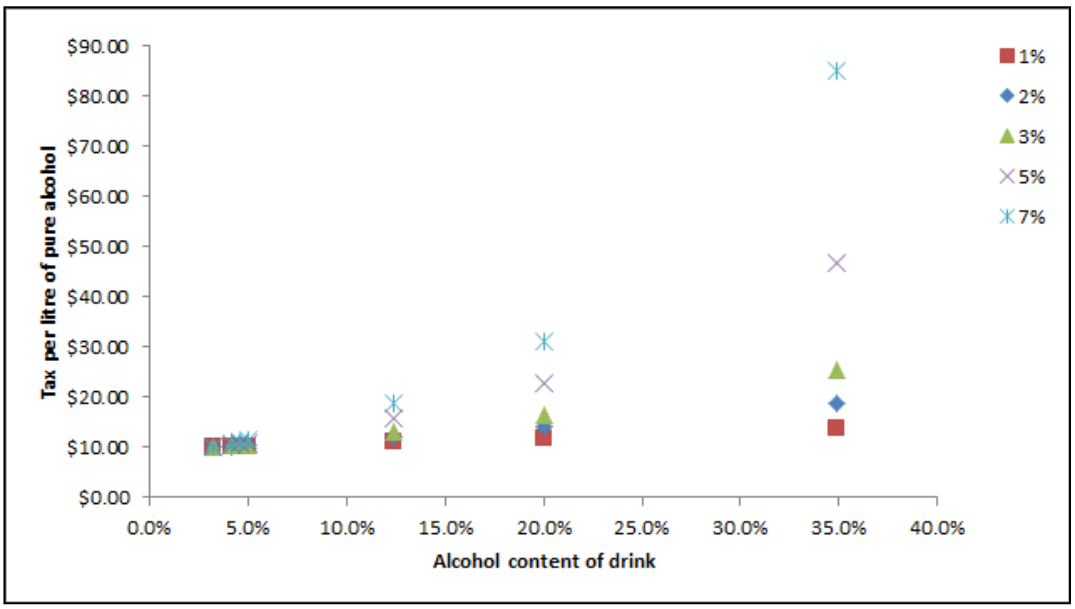
where *h* is the proportion of average alcohol consumption by hazardous drinkers, q_H is the average quantity of alcohol consumption by hazardous drinkers, p_H is the prevalence of hazardous drinkers, q_M is the mean quantity of alcohol consumption by moderate drinkers and p_M is the prevalence of moderate drinkers. The average quantity of alcohol and prevalence of drinkers were estimated from the National Health Survey (Australian Bureau of Statistics 2009c).

Although the current taxation regime categorises beer into three categories of low, mid and heavy strength, due to data constraints, our modelling is based on heavy- and low-strength beer (i.e. combined low and mid strength), with the excise and subsequent onsite/offsite discounts based on the weighted averages (in volume) of mid- and low-strength beers.

Applying excise rates exponentially

Under scenarios 5–12, outlined earlier, excise rates imposed on alcoholic beverages would increase exponentially by 1, 2, 5, 7 and 10 per cent, respectively, for each per cent of alcohol contained in each beverage. The exponential growth in the taxation rate is displayed in Figure 2 for scenarios 5–11. A 10 per cent exponential increase is not included in Figure 2, due to scale problems, that is, the upper limit of the vertical axis becomes too large for the 10 per cent exponential rate, which reduces the readability of the Figure.

Figure 2: Exponential excise rate modelling of scenarios 5–11



Results

Base case

Table 6 provides data by alcoholic beverage on quantity consumed in litres and pure alcohol, and a per capita basis; total value of sales; excise, GST and total tax collected; price per litre and standard drink and taxation per standard drink. The base-case results (using 2010 sales data and taxation rates) indicate that 2.83 million litres of alcohol were consumed. Based on average alcohol content levels, per capita consumption of pure alcohol is estimated at 8.09 litres per person. High-strength beer was the most common alcoholic beverage consumed, with 1.46 million litres (or 51.8 per cent of all alcohol) sold offsite, and 0.34 million litres (or 12.3 per cent of all alcohol) sold onsite. The value of sales for alcoholic beverages in 2010 is estimated at $31.7 billion, of which high-strength beer accounted $13 billion (or 41.2 per cent of total sales), with offsite beer sales accounting for $7.7 billion (or 24.2 per cent of total sales), and onsite beer sales accounting for $5.4 billion (or 17 per cent of total sales).

Total taxation (excise + GST) revenue collected from the consumption of alcohol is estimated at $8.58 billion, with high-strength beer sold offsite accounting for $2.76 billion (or 32 per cent of total revenue), and spirits sold offsite at $1.33 billion (or 15.5 per cent 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), fortified wine was the cheapest, being sold offsite at $0.68 per standard drink, while alcopops were the most expensive, being sold onsite at $7.49 per standard drink.

Table 6 also identifies significant discrepancies between the tax per standard drink, ranging from a low of $0.10 per standard drink for fortified wine, to a high of $0.88 for spirits. When compared to the alcohol content of each beverage (Table 4), there is no consistent relationship between price and tax per standard drink. The largest discrepancies are found in the wine-based products that are subject to an ad valorem tax. Fortified wine has an average alcohol volume of 20 per cent, and is taxed, on average, at $0.10 per standard drink. A tax imposed on value provides an incentive for manufactures to keep the price relatively low (as seen by price per standard drink), which reduces the amount of tax paid per standard drink. The duty-free threshold for beer and the discounts provided for onsite consumption creates another distortion in the effective tax of a product. For example, the excise tax payable on a high-strength beer sold onsite is lower than that for a low-strength beer sold onsite.

Table 6: Base-case results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed per capita	Quantity consumed (/1,000 litres pure alcohol)	Quantity consumed pure alcohol per capita	Value of consumption ($m)	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	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	1,463	65.5	67.3	3.01	$ 7,683	$ 2,060	$ 698	$ 2,758	$ 5.25	$ 1.45	$ 0.39
High-strength beer -onsite	340	15.2	15.6	0.70	$ 5,387	$ 337	$ 490	$ 827	$ 15.84	$ 4.36	$ 0.27
Wine -offsite	338	15.1	42.0	1.88	$ 3,904	$ 559	$ 355	$ 913	$ 11.55	$ 1.18	$ 0.17
Wine -onsite	80	3.6	9.9	0.44	$ 3,343	$ 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	$ 2,313	$ 1,116	$ 210	$ 1,326	$ 49.97	$ 1.82	$ 0.88
Spirits -onsite	15	0.7	5.4	0.24	$ 2,087	$ 373	$ 190	$ 563	$ 134.73	$ 4.90	$ 0.88
Alcopops -offsite	209	9.3	8.7	0.39	$ 2,510	$ 605	$ 228	$ 833	$ 12.02	$ 3.63	$ 0.87
Alcopops -onsite	118	5.3	4.9	0.22	$ 2,918	$ 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	**2,826**	**126.5**	**180.6**	**8.09**	**$ 31,714**	**$ 5,693**	**$ 2,883**	**$ 8,576**			

Scenario 1: Applying a universal excise tax rate on alcoholic beverages equal to the current excise rate applicable to high-strength beer sold offsite

Scenario 1 applies a universal excise tax rate on alcoholic beverages equal to the current excise rate applicable to high-strength beer sold offsite, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits. Table 7 provides data on quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 0.6 per cent, with a 4.2 per cent increase in the amount of taxation collected. The price of spirits and alcopops is lowered, which has the dual effect of increasing the consumption of these beverage types and lowering the taxation revenue collected from these sales. The excise tax

per standard drink for a spirit falls from $0.88 under the base-case scenario, to $0.52 under scenario 1. The majority of the overall taxation gain comes from higher taxes on lower-strength beer, high-strength beer sold onsite, wine and fortified wine.

Table 7: Scenario 1 results

Beverage	Quantity consumed ('000s litres)	Quantity consumed ('000s litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	128	4.1	0.5%	$ 107	$ 52	$ 159	3.7%	$ 4.52	0.9%	$ 1.79	$ 0.33
Low-strength beer -onsite	29	0.9	-0.7%	$ 25	$ 37	$ 62	33.7%	$ 14.07	4.0%	$ 5.57	$ 0.33
High-strength beer -offsite	1477	67.9	1.0%	$ 2,080	$ 705	$ 2,786	1.0%	$ 5.25	0.0%	$ 1.45	$ 0.39
High-strength beer -onsite	339	15.6	-0.4%	$ 477	$ 502	$ 979	18.4%	$ 16.29	2.9%	$ 4.49	$ 0.39
Wine -offsite	292	36.3	-13.6%	$ 1,344	$ 393	$ 1,737	90.1%	$ 14.79	28.1%	$ 1.51	$ 0.47
Wine -onsite	78	9.7	-2.7%	$ 358	$ 319	$ 677	55.2%	$ 45.03	7.8%	$ 4.60	$ 0.47
Fortified wine -offsite	9	1.8	-32.4%	$ 71	$ 15	$ 85	151.0%	$ 17.46	63.5%	$ 1.11	$ 0.49
Fortified wine -onsite	3	0.6	-6.0%	$ 23	$ 12	$ 36	120.4%	$ 45.44	17.5%	$ 2.88	$ 0.49
Spirits -offsite	53	18.4	13.8%	$ 749	$ 187	$ 936	-29.4%	$ 39.11	-21.7%	$ 1.42	$ 0.52
Spirits -onsite	20	6.8	26.3%	$ 278	$ 220	$ 498	-11.5%	$123.86	-8.1%	$ 4.50	$ 0.52
Alcopops -offsite	221	9.3	5.9%	$ 274	$ 205	$ 479	-42.5%	$ 10.20	-15.2%	$ 3.08	$ 0.37
Alcopops -onsite	120	5.0	2.3%	$ 150	$ 251	$ 401	-33.9%	$ 22.95	-7.4%	$ 6.94	$ 0.38
Cider -offsite	31	1.5	-6.3%	$ 48	$ 18	$ 66	64.7%	$ 6.43	16.9%	$ 1.63	$ 0.40
Cider -onsite	11	0.5	-1.6%	$ 17	$ 15	$ 31	44.1%	$ 14.93	6.6%	$ 3.78	$ 0.40
TOTAL	**2810**	**178.5**	**-0.6%**	**$ 6,001**	**$2,932**	**$ 8,933**	**4.2%**				

After modelling changes in excise rates consistent with scenario 1, 18,000 DALYs are averted (95 per cent uncertainty interval (UI): 14,000–21,000 DALYs averted). The cost of implementing scenario 1 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $250 million in cost offsets to the healthcare system (UI: –$370 million to –$150 million). The net cost of implementing scenario 1 is estimated at a saving of $230 million (UI: –$350 million to –$130 million). The results are presented in Figure 3, which plots net costs (intervention costs minus the cost offsets) on the y-axis and health outcome (i.e. lifetime DALYs averted) on the x-axis. The results are scattered in the south-east quadrants of the cost-effectiveness plane, which indicate a dominant intervention. In ACE–Prevention, cost-effectiveness is compared to a threshold of affordability (i.e. $50,000 per DALY averted). The results fall below this threshold in 100 per cent of cases, that is, to the right of the black line representing $50,000 per DALY averted, suggesting that scenario 1 is a cost-effective option in comparison to the base case.

Figure 3: Cost-effectiveness plane of scenario 1

Scenario 2: Applying a universal tax rate on alcoholic beverages equal to the current excise applicable to spirits and alcopops

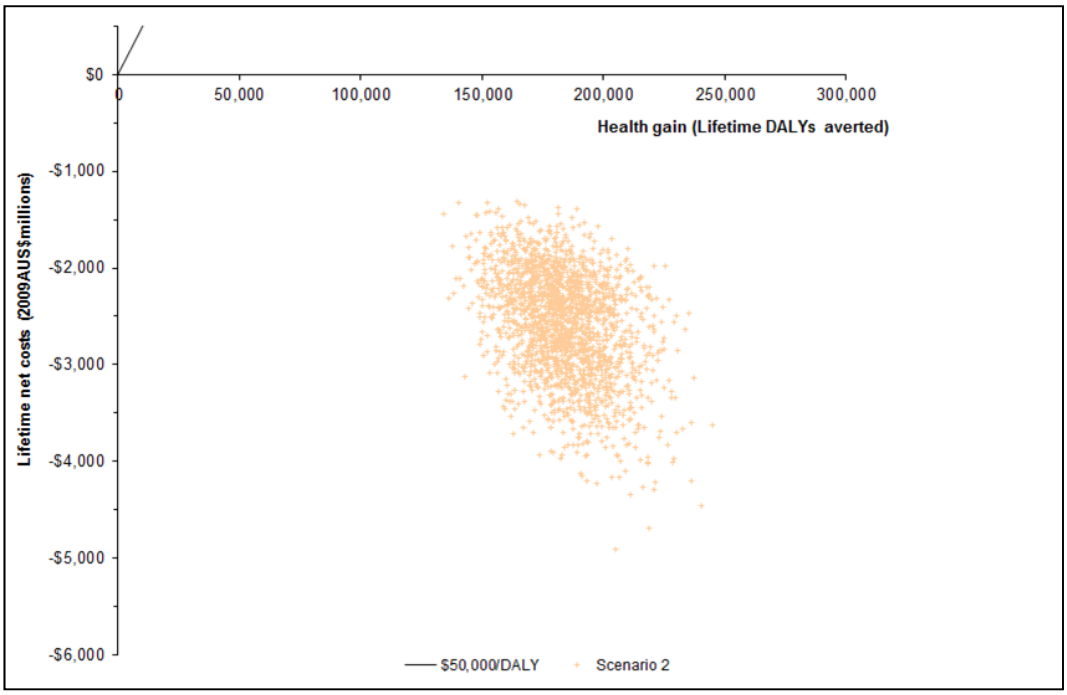
Scenario 2 applies a universal tax rate on alcoholic beverages equal to the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits. Table 8 provides data quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 8.6 per cent, with a 42.2 per cent increase in the amount of taxation collected. The price of all alcoholic beverages (except spirits and alcopops) increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales. The excise tax per standard drink for a low-strength beer sold onsite increases from $0.14 under the base-case scenario, to $0.56 under scenario 2. The majority of the overall taxation gain comes from higher taxes on higher-strength beer and wine sold offsite.

Table 8: Scenario 2 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	120	3.8	-5.9%	$ 169	$ 56	$ 226	46.9%	$ 5.16	15.1%	$ 2.04	$ 0.56
Low-strength beer -onsite	29	0.9	-0.8%	$ 42	$ 39	$ 81	73.9%	$ 14.71	8.8%	$ 5.82	$ 0.56
High-strength beer -offsite	1337	61.5	-8.6%	$ 3,190	$ 769	$ 3,959	43.5%	$ 6.33	20.5%	$ 1.74	$ 0.66
High-strength beer -onsite	333	15.3	-2.1%	$ 795	$ 526	$ 1,321	59.7%	$ 17.37	9.7%	$ 4.79	$ 0.66
Wine -offsite	244	30.4	-27.7%	$ 1,905	$ 407	$ 2,312	153.1%	$ 18.30	58.5%	$ 1.87	$ 0.80
Wine -onsite	76	9.4	-5.6%	$ 588	$ 333	$ 922	111.4%	$ 48.55	16.2%	$ 4.95	$ 0.80
Fortified wine -offsite	5	1.1	-59.6%	$ 72	$ 12	$ 83	145.1%	$ 23.34	118.6%	$ 1.48	$ 0.83
Fortified wine -onsite	3	0.6	-11.3%	$ 37	$ 13	$ 50	211.5%	$ 51.31	32.8%	$ 3.25	$ 0.83
Spirits -offsite	47	16.5	2.1%	$ 1,138	$ 215	$ 1,353	2.1%	$ 49.97	0%	$ 1.82	$ 0.88
Spirits -onsite	16	5.5	1.2%	$ 378	$ 192	$ 570	1.2%	$134.73	0%	$ 4.90	$ 0.88
Alcopops -offsite	215	9.0	3.0%	$ 452	$ 218	$ 670	-19.6%	$ 11.14	-7.3%	$ 3.36	$ 0.63
Alcopops -onsite	119	5.0	1.4%	$ 251	$ 260	$ 511	-15.8%	$ 23.90	-3.5%	$ 7.23	$ 0.64
Cider -offsite	28	1.4	-14.1%	$ 75	$ 19	$ 94	134.9%	$ 7.63	38.7%	$ 1.93	$ 0.67
Cider -onsite	11	0.5	-3.1%	$ 28	$ 15	$ 43	100.0%	$ 16.13	15.2%	$ 4.09	$ 0.67
TOTAL	**2583**	**160.9**	**-8.6%**	**$ 9,121**	**$3,074**	**$ 12,195**	**42.2%**				

After modelling changes in excise rates consistent with scenario 2, 180,000 DALYs are averted (95 per cent UI: 150,000–220,000 DALYs averted). The cost of implementing scenario 2 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $2.6 billion in cost offsets to the healthcare system (UI: –$3.8 billion to –$1.7 billion). The net cost of implementing scenario 2 is estimated at a saving of $2.6 billion (UI: –$3.7 billion to –$1.6 billion). The results are presented in Figure 4, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 2 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 4: Cost-effectiveness plane of scenario 2



Scenario 3: Applying a universal tax rate on alcoholic beverages equivalent to a 10 per cent increase in the current excise applicable to spirits and alcopops

Scenario 3 applies a universal tax rate on alcoholic beverages equivalent to a 10 per cent increase in the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits. Table 9 provides data on quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 10.6 per cent, with a 49.8 per cent increase in the amount of taxation collected. The price of all alcoholic beverages (except spirits and alcopops) increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales. The excise tax per standard drink for a low-strength

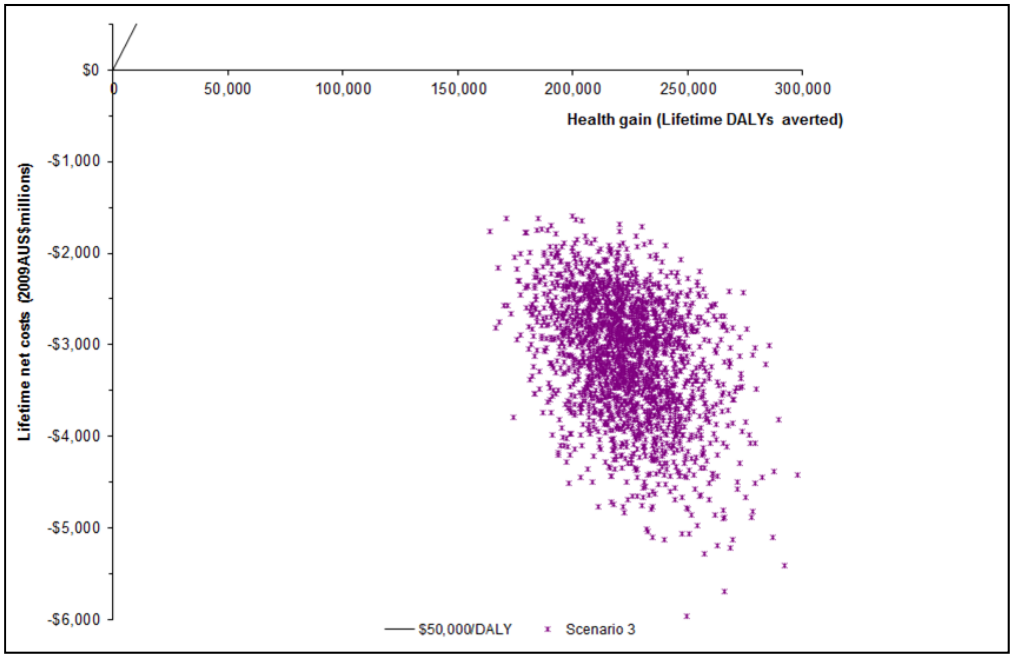
beer sold onsite increases from $0.14 under the base-case scenario, to $0.62 under scenario 3. The majority of the overall taxation gain comes from higher taxes on higher-strength beer and wine sold offsite.

Table 9: Scenario 3 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	118	3.8	-7.4%	$ 183	$ 57	$ 240	56.4%	$ 5.32	18.6%	$ 2.11	$ 0.62
Low-strength beer -onsite	29	0.9	-0.9%	$ 46	$ 40	$ 85	83.7%	$ 14.86	9.9%	$ 5.89	$ 0.62
High-strength beer -offsite	1303	59.9	-10.9%	$ 3,419	$ 781	$ 4,200	52.3%	$ 6.59	25.5%	$ 1.82	$ 0.72
High-strength beer -onsite	332	15.3	-2.5%	$ 871	$ 532	$ 1,402	69.6%	$ 17.63	11.3%	$ 4.86	$ 0.72
Wine -offsite	233	28.9	-31.1%	$ 1,996	$ 406	$ 2,402	162.9%	$ 19.16	65.9%	$ 1.95	$ 0.87
Wine -onsite	75	9.3	-6.3%	$ 642	$ 337	$ 979	124.5%	$ 49.40	18.2%	$ 5.04	$ 0.87
Fortified wine -offsite	5	0.9	-66.2%	$ 66	$ 10	$ 76	124.2%	$ 24.77	132.0%	$ 1.57	$ 0.91
Fortified wine -onsite	3	0.6	-12.6%	$ 40	$ 13	$ 54	231.9%	$ 52.75	36.5%	$ 3.34	$ 0.91
Spirits -offsite	46	16.0	-0.8%	$ 1,217	$ 220	$ 1,437	8.4%	$ 52.62	5.3%	$ 1.91	$ 0.96
Spirits -onsite	15	5.1	-5.0%	$ 390	$ 184	$ 574	2.0%	$137.38	2.0%	$ 5.00	$ 0.96
Alcopops -offsite	214	9.0	2.3%	$ 494	$ 221	$ 715	-14.2%	$ 11.38	-5.4%	$ 3.43	$ 0.70
Alcopops -onsite	119	5.0	1.2%	$ 276	$ 262	$ 537	-11.4%	$ 24.13	-2.6%	$ 7.30	$ 0.70
Cider -offsite	27	1.4	-16.1%	$ 80	$ 20	$ 100	149.7%	$ 7.92	44.0%	$ 2.01	$ 0.74
Cider -onsite	10	0.5	-3.5%	$ 31	$ 16	$ 46	113.4%	$ 16.42	17.3%	$ 4.16	$ 0.74
TOTAL	**2528**	**156.6**	**-10.6%**	**$ 9,752**	**$3,096**	**$ 12,848**	**49.8%**				

After modelling changes in excise rates consistent with scenario 3, 220,000 DALYs are averted (95 per cent UI: 180,000–270,000 DALYs averted). The cost of implementing scenario 3 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $3.2 billion in cost offsets to the healthcare system (UI: –$4.6 billion to –$2 billion). The net cost of implementing scenario 3 is estimated at a saving of $3.1 billion (UI: –$4.6 billion to –$2 billion). The results are presented in Figure 5, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 3 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 5: Cost-effectiveness plane of scenario 3



Scenario 4: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (except spirits and alcopops) equal to the current excise applicable to high-strength beer sold offsite; the second tier applies the current excise applicable to spirits and alcopops

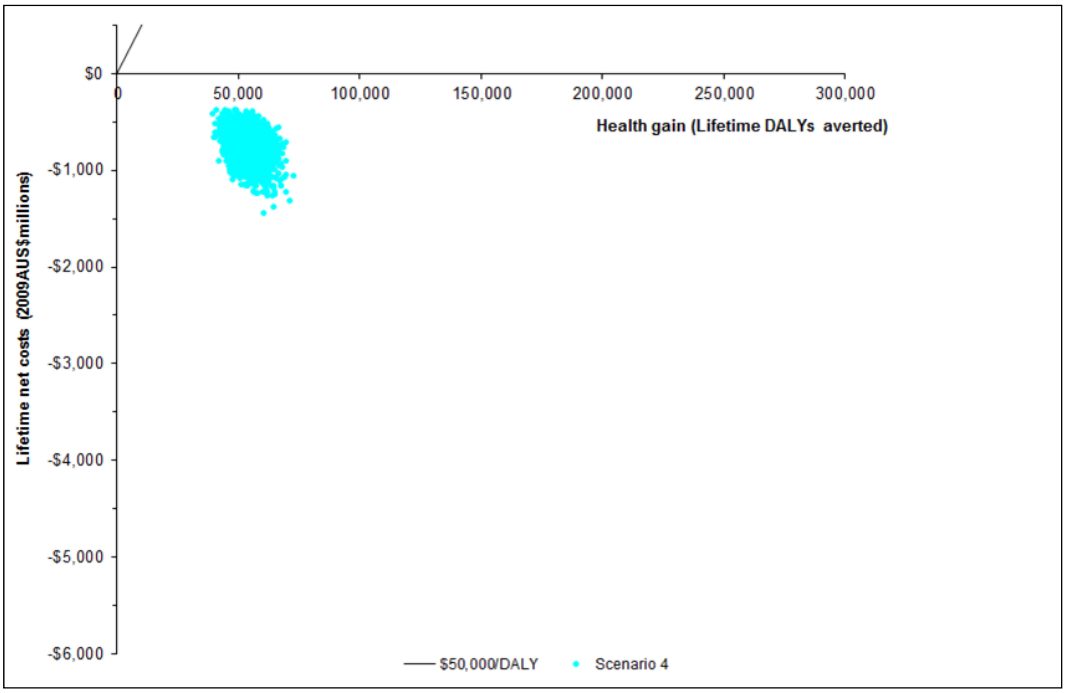
Scenario 4 applies a two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (except spirits and alcopops) equal to the current excise applicable to high-strength beer sold offsite; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits. Table 10 provides data on quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 1.1 per cent, with a 13.2 per cent increase in the amount of taxation collected. The price of wine and fortified wine increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales. Excise tax collected from high-strength beer sold onsite also increases by 18.6 per cent. The excise tax per standard drink for a low-strength beer sold onsite increases from $0.14 under the base-case scenario, to $0.33 under scenario 4.

Table 10: Scenario 4 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	128	4.1	0.6%	$ 107	$ 53	$ 159	3.8%	$ 4.52	0.9%	$ 1.79	$ 0.33
Low-strength beer -onsite	29	0.9	-0.6%	$ 25	$ 38	$ 62	33.8%	$ 14.07	4.0%	$ 5.57	$ 0.33
High-strength beer -offsite	1478	68.0	1.1%	$ 2,082	$ 706	$ 2,788	1.1%	$ 5.25	0%	$ 1.45	$ 0.39
High-strength beer -onsite	339	15.6	-0.2%	$ 478	$ 503	$ 981	18.6%	$ 16.29	2.9%	$ 4.49	$ 0.39
Wine -offsite	292	36.3	-13.5%	$ 1,345	$ 393	$ 1,738	90.2%	$ 14.79	28.1%	$ 1.51	$ 0.47
Wine -onsite	78	9.7	-2.7%	$ 358	$ 319	$ 677	55.2%	$ 45.03	7.8%	$ 4.60	$ 0.47
Fortified wine -offsite	9	1.8	-32.4%	$ 71	$ 15	$ 85	151.2%	$ 17.46	63.5%	$ 1.11	$ 0.49
Fortified wine -onsite	3	0.6	-6.1%	$ 23	$ 12	$ 36	120.3%	$ 45.44	17.5%	$ 2.88	$ 0.49
Spirits -offsite	47	16.3	0.8%	$ 1,124	$ 212	$ 1,336	0.8%	$ 49.97	0%	$ 1.82	$ 0.88
Spirits -onsite	16	5.4	0.3%	$ 374	$ 190	$ 565	0.3%	$134.73	0%	$ 4.90	$ 0.88
Alcopops -offsite	215	9.0	2.9%	$ 452	$ 218	$ 670	-19.7%	$ 11.14	-7.3%	$ 3.36	$ 0.63
Alcopops -onsite	119	5.0	1.3%	$ 251	$ 259	$ 510	-15.9%	$ 23.90	-3.5%	$ 7.23	$ 0.64
Cider -offsitef	31	1.5	-6.2%	$ 48	$ 18	$ 66	64.9%	$ 6.43	16.9%	$ 1.63	$ 0.40
Cider -onsite	11	0.5	-1.5%	$ 17	$ 15	$ 31	44.2%	$ 14.93	6.6%	$ 3.78	$ 0.40
TOTAL	**2795**	**174.8**	**-1.1%**	**$ 6,755**	**$2,949**	**$ 9,703**	**13.2%**				

After modelling changes in excise rates consistent with scenario 4, 54,000 DALYs are averted (95 per cent UI: 44,000–65,000 DALYs averted). The cost of implementing scenario 4 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $760 million in cost offsets to the healthcare system (UI: –$1.1 billion to –$490 million). The net cost of implementing scenario 4 is estimated at a saving of $740 million (UI: –$1.1 billion to –$470 million). The results are presented in Figure 6, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 4 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 6: Cost-effectiveness plane of scenario 4



Scenario 5: Tiered tax rate, with the excise rate increasing exponentially by 1 per cent for every per cent increase in alcohol content above 3.2 per cent.

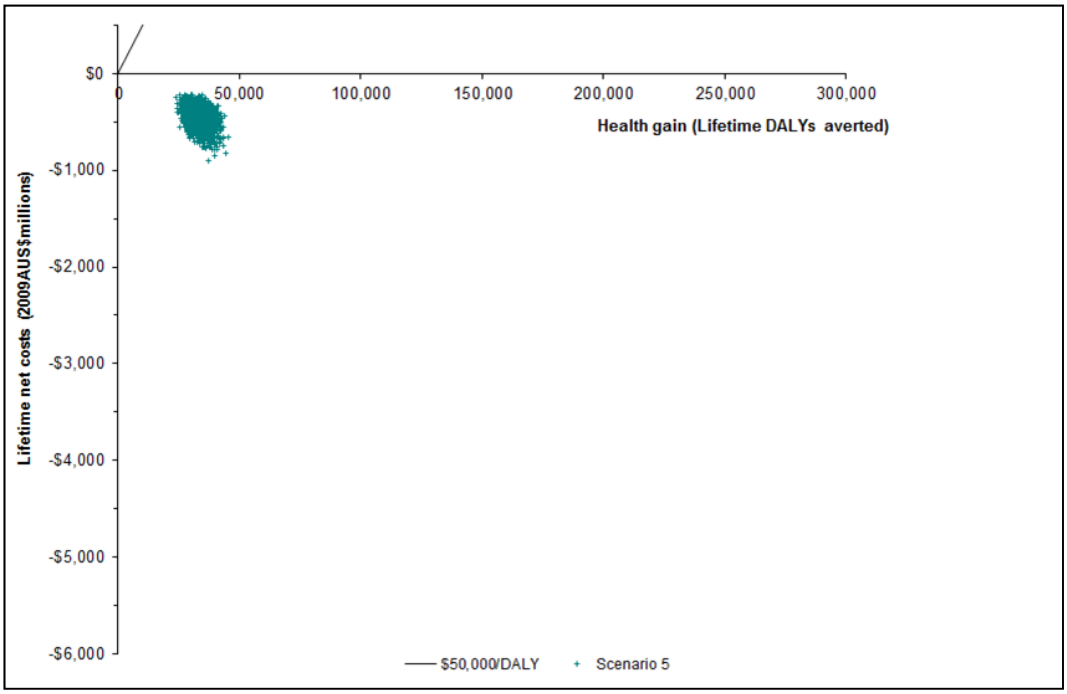
Scenario 5 applies a tiered tax rate, with the excise rate increasing exponentially by 1 per cent for every per cent increase in alcohol content above 3.2 per cent, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits and alcopops. Table 11 provides data on quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 0.5 per cent, with a 6.6 per cent increase in the amount of taxation collected. The price of wine and fortified wine increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales. However, the price of spirits and alcopops falls, which increases the consumption of these beverage types and reduces the taxation revenue collected from these sales. The excise tax per standard drink for a wine increases from $0.17 under the base-case scenario, to $0.48 under scenario 5. Conversely, the excise tax per standard drink for spirits and alcopops decreases from $0.88 under the base-case scenario, to $0.68 and $0.50, respectively.

Table 11: Scenario 5 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	128	4.1	0.9%	$ 103	$ 52	$ 155	0.9%	$ 4.49	0%	$ 1.78	$ 0.32
Low-strength beer -onsite	30	1.0	1.5%	$ 10	$ 37	$ 47	1.5%	$ 13.52	0%	$ 5.36	$ 0.14
Hig-strength beer -offsite	1484	68.3	1.4%	$ 2,031	$ 703	$ 2,733	-0.9%	$ 5.21	-0.8%	$ 1.44	$ 0.38
Hig-strength beer -onsite	345	15.9	1.4%	$ 332	$ 496	$ 828	0.1%	$ 15.81	-0.2%	$ 4.35	$ 0.27
Wine -offsite	289	35.9	-14.4%	$ 1,375	$ 393	$ 1,768	93.6%	$ 14.95	29.5%	$ 1.53	$ 0.48
Wine -onsite	78	9.7	-2.8%	$ 369	$ 319	$ 689	57.9%	$ 45.20	8.2%	$ 4.61	$ 0.48
Fortified wine -offsite	8	1.7	-38.1%	$ 73	$ 14	$ 88	157.9%	$ 18.58	74.1%	$ 1.18	$ 0.55
Fortified wine -onsite	3	0.6	-7.0%	$ 26	$ 13	$ 39	138.8%	$ 46.56	20.5%	$ 2.95	$ 0.55
Spirits -offsite	50	17.4	7.8%	$ 932	$ 200	$ 1,132	-14.6%	$ 44.01	-11.9%	$ 1.60	$ 0.68
Spirits -onsite	18	6.2	14.4%	$ 331	$ 208	$ 539	-4.3%	$128.76	-4.4%	$ 4.68	$ 0.68
Alcopops -offsite	218	9.1	4.5%	$ 361	$ 211	$ 572	-31.3%	$ 10.65	-11.4%	$ 3.22	$ 0.50
Alcopops -onsite	120	5.0	1.7%	$ 198	$ 255	$ 453	-25.3%	$ 23.41	-5.5%	$ 7.08	$ 0.50
Cider -offsite	31	1.5	-5.9%	$ 47	$ 18	$ 65	62.1%	$ 6.39	16.1%	$ 1.62	$ 0.39
Cider -onsite	11	0.5	-1.6%	$ 16	$ 14	$ 31	42.1%	$ 14.89	6.3%	$ 3.77	$ 0.39
TOTAL	**2812**	**176.8**	**-0.5%**	**$ 6,205**	**$2,933**	**$ 9,138**	**6.6%**				

After modelling changes in excise rates consistent with scenario 5, 33,000 DALYs are averted (95 per cent UI: 27,000–40,000 DALYs averted). The cost of implementing scenario 5 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $470 million in cost offsets to the healthcare system (UI: –$700 million to –$300 million). The net cost of implementing scenario 5 is estimated at a saving of $450 million (UI: –$670 million to –$270 million). The results are presented in Figure 7, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 5 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 7: Cost-effectiveness plane of scenario 5



Scenario 6: Tiered tax rate, with the excise rate increasing exponentially by 2 per cent for every per cent increase in alcohol content above 3.2 per cent

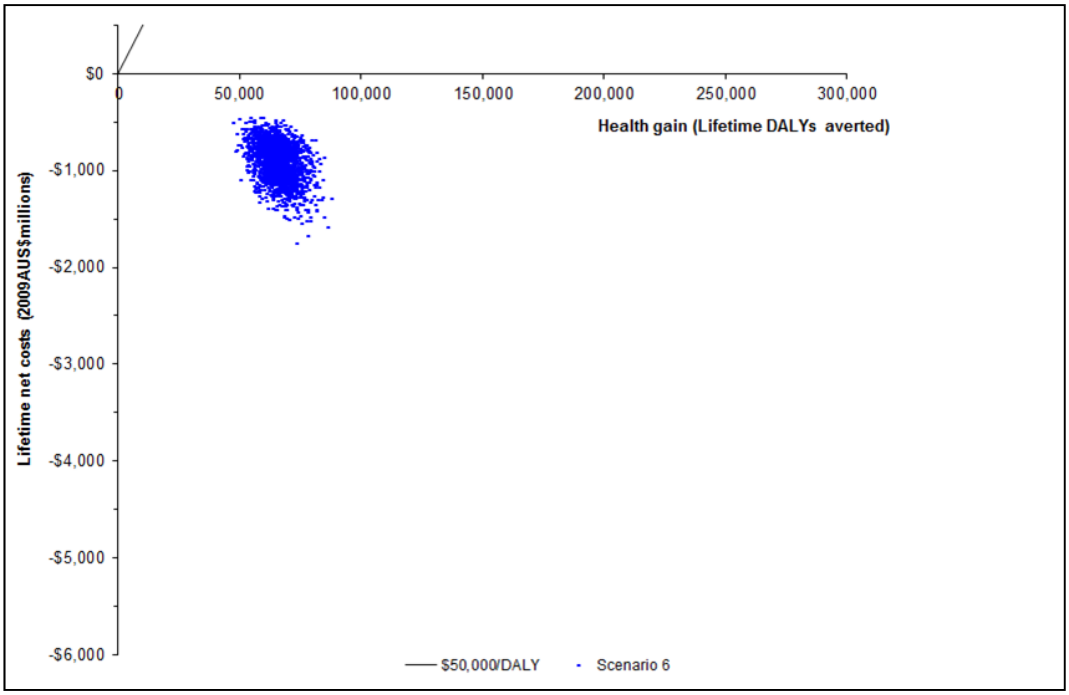
Scenario 6 applies a tiered tax rate, with the excise rate increasing exponentially by 2 per cent for every per cent increase in alcohol content above 3.2 per cent, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits and alcopops. Table 12 provides data on the quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 0.9 per cent, with an 11.7 per cent increase in the amount of taxation collected. The price of wine and fortified wine increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales. However, the price of spirits and alcopops falls, which increases the consumption of these beverage types and reduces the taxation revenue collected from these sales. The excise tax per standard drink for wine increases from $0.17 under the base-case scenario, to $0.52 under scenario 6. Conversely, the excise tax per standard drink for alcopops decreases from $0.88 under the base-case scenario, to $0.50 under scenario 6.

Table 12: Scenario 6 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	128	4.1	1.2%	$ 103	$ 52	$ 155	1.2%	$ 4.49	0%	$ 1.78	$ 0.32
Low-strength beer -onsite	30	1.0	1.8%	$ 10	$ 37	$ 47	1.8%	$ 13.52	0%	$ 5.36	$ 0.14
High-strength beer -offsite	1484	68.3	1.4%	$ 2,059	$ 706	$ 2,765	0.2%	$ 5.23	-0.4%	$ 1.44	$ 0.38
High-strength beer -onsite	346	15.9	1.6%	$ 338	$ 497	$ 835	1.0%	$ 15.82	-0.1%	$ 4.36	$ 0.27
Wine -offsite	284	35.3	-16.0%	$ 1,452	$ 396	$ 1,849	102.4%	$ 15.35	33.0%	$ 1.57	$ 0.52
Wine -onsite	77	9.6	-3.2%	$ 396	$ 321	$ 717	64.5%	$ 45.60	9.1%	$ 4.65	$ 0.52
Fortified wine -offsite	7	1.5	-46.4%	$ 75	$ 13	$ 88	160.1%	$ 20.31	90.2%	$ 1.29	$ 0.65
Fortified wine -onsite	3	0.6	-8.6%	$ 30	$ 13	$ 43	166.1%	$ 48.29	24.9%	$ 3.06	$ 0.65
Spirits -offsite	46	16.0	-1.1%	$ 1,168	$ 214	$ 1,383	4.3%	$ 51.53	3.1%	$ 1.87	$ 0.93
Spirits -onsite	15	5.2	-3.5%	$ 381	$ 185	$ 566	0.6%	$136.28	1.2%	$ 4.96	$ 0.93
Alcopops -offsite	218	9.1	4.4%	$ 364	$ 212	$ 576	-30.9%	$ 10.67	-11.2%	$ 3.22	$ 0.50
Alcopops -onsite	120	5.0	1.9%	$ 201	$ 256	$ 456	-24.8%	$ 23.43	-5.4%	$ 7.09	$ 0.51
Cider -offsite	31	1.5	-5.9%	$ 48	$ 18	$ 66	64.4%	$ 6.42	16.7%	$ 1.63	$ 0.40
Cider -onsite	11	0.5	-1.4%	$ 17	$ 15	$ 31	43.8%	$ 14.92	6.6%	$ 3.78	$ 0.40
TOTAL	**2800**	**173.6**	**-0.9%**	**$ 6,643**	**$2,935**	**$ 9,578**	**11.7%**				

After modelling changes in excise rates consistent with scenario 6, 65,000 DALYs are averted (95 per cent UI: 53,000–78,000 DALYs averted). The cost of implementing scenario 6 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $920 million in cost offsets to the healthcare system (UI: –$1.3 billion to –$590 million). The net cost of implementing scenario 6 is estimated at a saving of $900 million (UI: –$1.3 billion to –$570 million). The results are presented in Figure 8, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 6 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 8: Cost-effectiveness plane of scenario 6



Scenario 7: Tiered tax rate, with excise rate increasing exponentially by 3 per cent for every per cent increase in alcohol content above 3.2 per cent

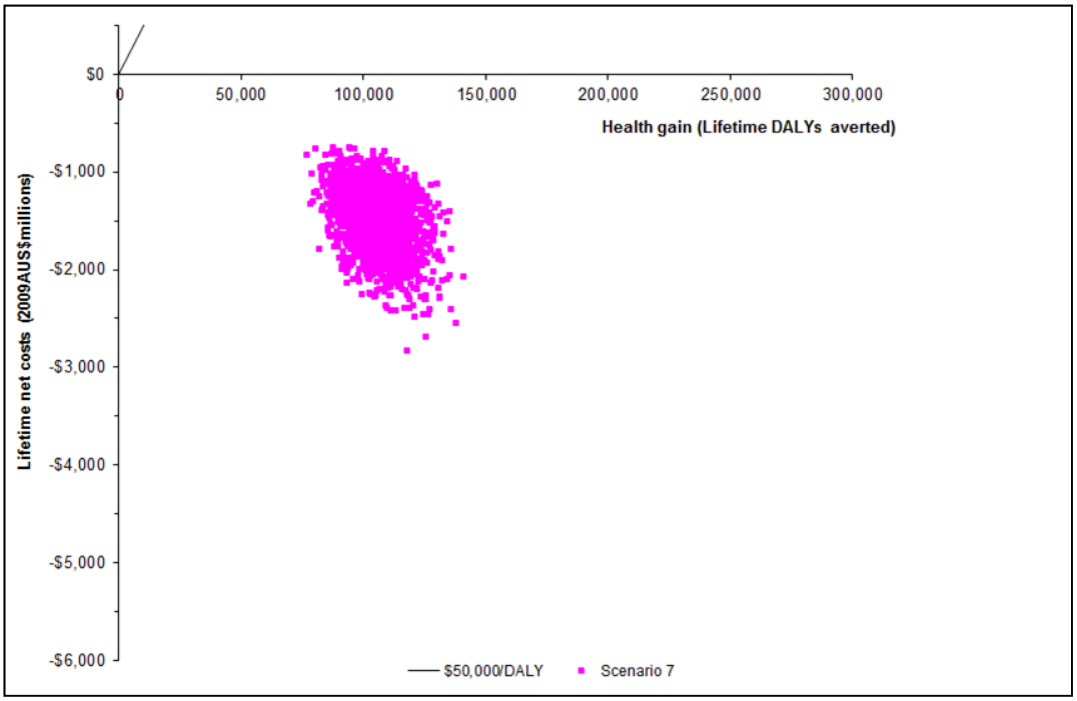
Scenario 7 applies a tiered tax rate, with the excise rate increasing exponentially by 3 per cent for every per cent increase in alcohol content above 3.2 per cent, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits and alcopops. Table 13 provides data on the quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 1.4 per cent, with a 16 per cent increase in the amount of taxation collected. The price of wine, fortified wine and spirits increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales (with the exception of tax revenue declining for spirits sold onsite). However, the price of alcopops falls, which increases the consumption of these beverage types and reduces the taxation revenue collected from these sales. The excise tax per standard drink for spirits increases from $0.88 under the base-case scenario, to $1.26 under scenario 7. Conversely, the excise tax per standard drink for alcopops decreases from $0.88 under the base-case scenario, to $0.51 under scenario 7.

Table 13: Scenario 7 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	129	4.1	1.4%	$ 103	$ 53	$ 156	1.4%	$ 4.49	0%	$ 1.78	$ 0.32
Low-strength beer -onsite	30	1.0	2.2%	$ 10	$ 37	$ 47	2.2%	$ 13.52	0%	$ 5.36	$ 0.14
High-strength beer -offsite	1485	68.3	1.5%	$ 2,089	$ 709	$ 2,797	1.4%	$ 5.25	0%	$ 1.45	$ 0.39
High-strength beer -onsite	347	15.9	1.9%	$ 343	$ 499	$ 842	1.9%	$ 15.84	0%	$ 4.36	$ 0.27
Wine -offsite	278	34.6	-17.7%	$ 1,531	$ 399	$ 1,931	111.4%	$ 15.78	36.7%	$ 1.61	$ 0.56
Wine -onsite	77	9.6	-3.6%	$ 424	$ 323	$ 747	71.4%	$ 46.03	10.1%	$ 4.70	$ 0.56
Fortified wine -offsite	6	1.2	-56.2%	$ 72	$ 12	$ 84	148.2%	$ 22.33	109.1%	$ 1.41	$ 0.77
Fortified wine -onsite	3	0.6	-10.4%	$ 35	$ 13	$ 48	196.6%	$ 50.30	30.1%	$ 3.19	$ 0.77
Spirits -offsite	40	14.0	-13.1%	$ 1,397	$ 225	$ 1,623	22.4%	$ 61.68	23.4%	$ 2.24	$ 1.26
Spirits -onsite	11	3.9	-27.8%	$ 389	$ 149	$ 537	-4.6%	$146.44	8.7%	$ 5.33	$ 1.26
Alcopops -offsite	218	9.1	4.4%	$ 368	$ 212	$ 580	-30.4%	$ 10.69	-11.1%	$ 3.23	$ 0.51
Alcopops -onsite	120	5.0	2.2%	$ 203	$ 257	$ 460	-24.2%	$ 23.45	-5.4%	$ 7.09	$ 0.51
Cider -offsite	31	1.5	-5.9%	$ 49	$ 18	$ 67	66.8%	$ 6.45	17.2%	$ 1.63	$ 0.40
Cider -onsite	11	0.5	-1.2%	$ 17	$ 15	$ 32	45.7%	$ 14.95	6.8%	$ 3.79	$ 0.40
TOTAL	**2786**	**169.4**	**-1.4%**	**$ 7,031**	**$2,920**	**$ 9,951**	**16.0%**				

After modelling changes in excise rates consistent with scenario 7, 110,000 DALYs are averted (95 per cent UI: 87,000–130,000 DALYs averted). The cost of implementing scenario 7 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $1.5 billion in cost offsets to the healthcare system (UI: –$2.2 billion to –$960 million). The net cost of implementing scenario 7 is estimated at a saving of $1.5 billion (UI: –$2.1billion to –$940 million). The results are presented in Figure 9, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 7 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 9: Cost-effectiveness plane of scenario 7



Scenario 8: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 3 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops

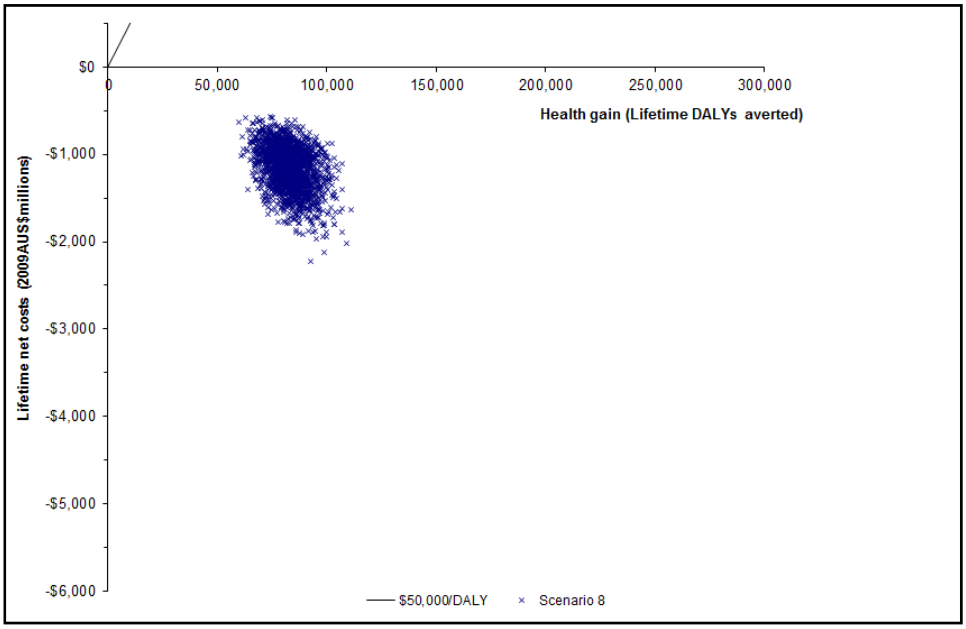
Scenario 8 applies a two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 3 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits. Table 14 provides data on the quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 1.7 per cent, with a 19.8 per cent increase in the amount of taxation collected. The price of wine, fortified wine and cider increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales. The price of beer, spirits and alcopops remains the same. The excise tax per standard drink for wine increases from $0.17 under the base-case scenario, to $0.62 under scenario 8.

Table 14: Scenario 8 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	129	4.1	1.6%	$ 103	$ 53	$ 156	1.6%	$ 4.49	0%	$ 1.78	$ 0.32
Low-strength beer -onsite	30	1.0	2.5%	$ 10	$ 37	$ 48	2.5%	$ 13.52	0%	$ 5.36	$ 0.14
High-strength beer -offsite	1487	68.4	1.6%	$ 2,092	$ 710	$ 2,801	1.6%	$ 5.25	0%	$ 1.45	$ 0.39
High-strength beer -onsite	348	16.0	2.2%	$ 344	$ 500	$ 845	2.1%	$ 15.84	0%	$ 4.36	$ 0.27
Wine -offsite	270	33.5	-20.3%	$ 1,635	$ 402	$ 2,037	123.0%	$ 16.40	42.0%	$ 1.67	$ 0.62
Wine -onsite	77	9.5	-4.0%	$ 466	$ 326	$ 791	81.5%	$ 46.65	11.6%	$ 4.76	$ 0.62
Fortified wine -offsite	5	1.1	-59.9%	$ 70	$ 11	$ 81	139.8%	$ 23.14	116.7%	$ 1.47	$ 0.81
Fortified wine -onsite	3	0.6	-11.1%	$ 37	$ 13	$ 50	208.7%	$ 51.11	32.2%	$ 3.24	$ 0.81
Spirits -offsite	47	16.3	1.1%	$ 1,128	$ 213	$ 1,340	1.1%	$ 49.97	0%	$ 1.82	$ 0.88
Spirits -onsite	16	5.4	0.3%	$ 375	$ 190	$ 565	0.3%	$134.73	0%	$ 4.90	$ 0.88
Alcopops -offsite	210	8.8	0.4%	$ 608	$ 229	$ 837	0.4%	$ 12.02	0%	$ 3.63	$ 0.87
Alcopops -onsite	118	4.9	-0.2%	$ 341	$ 265	$ 605	-0.2%	$ 24.78	0%	$ 7.49	$ 0.88
Cider -offsite	29	1.5	-9.8%	$ 61	$ 19	$ 79	98.2%	$ 6.97	26.7%	$ 1.77	$ 0.52
Cider -onsite	11	0.5	-2.6%	$ 22	$ 15	$ 37	69.0%	$ 15.47	10.5%	$ 3.92	$ 0.52
TOTAL	**2778**	**171.6**	**-1.7%**	**$ 7,290**	**$2,982**	**$ 10,272**	**19.8%**				

After modelling changes in excise rates consistent with scenario 8, 83,000 DALYs are averted (95 per cent UI: 68,000–99,000 DALYs averted). The cost of implementing scenario 8 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $1.2 billion in cost offsets to the healthcare system (UI: –$1.7 billion to –$750 million). The net cost of implementing scenario 8 is estimated at a saving of $1.2 billion (UI: –$1.7 billion to –$730 million). The results are presented in Figure 10, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 8 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 10: Cost-effectiveness plane of scenario 8



Scenario 9: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 5 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops

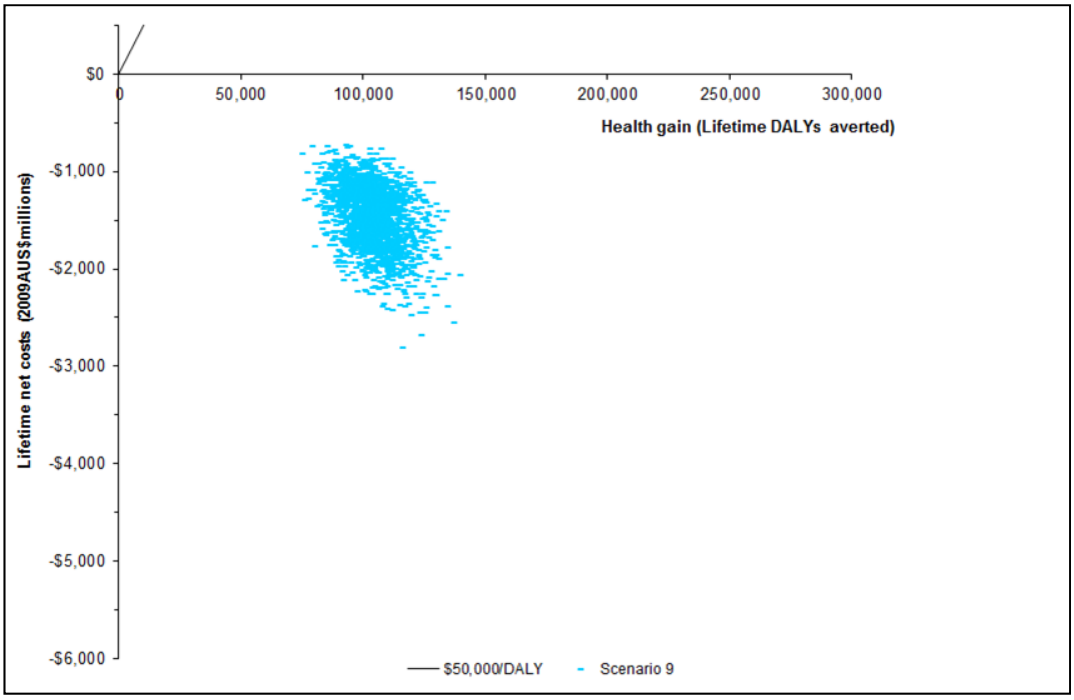
Scenario 9 applies a two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 5 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits. Table 15 provides data on the quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 2.2 per cent, with a 23.1 per cent increase in the amount of taxation collected. The price of wine, fortified wine and cider increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales. The price of beer, spirits and alcopops remains the same. The excise tax per standard drink for cider increases from $0.18 under the base-case scenario, to $0.54 under scenario 9.

Table 15: Scenario 9 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	130	4.1	2.0%	$ 104	$ 53	$ 157	2.0%	$ 4.49	0%	$ 1.78	$ 0.32
Low-strength beer -onsite	30	1.0	3.1%	$ 10	$ 37	$ 48	3.1%	$ 13.52	0%	$ 5.36	$ 0.14
High-strength beer -offsite	1488	68.4	1.7%	$ 2,150	$ 716	$ 2,866	3.9%	$ 5.29	0.8%	$ 1.46	$ 0.40
High-strength beer -onsite	349	16.1	2.6%	$ 355	$ 504	$ 859	3.9%	$ 15.86	0.2%	$ 4.37	$ 0.28
Wine -offsite	256	31.7	-24.4%	$ 1,790	$ 405	$ 2,195	140.3%	$ 17.43	51.0%	$ 1.78	$ 0.71
Wine -onsite	76	9.4	-4.9%	$ 533	$ 330	$ 863	97.9%	$ 47.68	14.1%	$ 4.87	$ 0.71
Fortified wine -offsite	2	0.4	-86.2%	$ 33	$ 5	$ 38	12.6%	$ 28.53	167.2%	$ 1.81	$ 1.13
Fortified wine -onsite	3	0.5	-15.9%	$ 48	$ 14	$ 62	282.0%	$ 56.51	46.2%	$ 3.58	$ 1.13
Spirits -offsite	47	16.4	1.4%	$ 1,131	$ 213	$ 1,344	1.4%	$ 49.97	0%	$ 1.82	$ 0.88
Spirits -onsite	16	5.4	0.3%	$ 375	$ 190	$ 565	0.3%	$134.73	0%	$ 4.90	$ 0.88
Alcopops -offsite	210	8.8	0.6%	$ 609	$ 230	$ 838	0.6%	$ 12.02	0%	$ 3.63	$ 0.87
Alcopops -onsite	117	4.9	-0.4%	$ 340	$ 264	$ 604	-0.4%	$ 24.78	0%	$ 7.49	$ 0.88
Cider -offsite	29	1.5	-9.9%	$ 63	$ 19	$ 82	103.8%	$ 7.05	28.2%	$ 1.79	$ 0.54
Cider -onsite	11	0.5	-2.3%	$ 23	$ 15	$ 38	73.4%	$ 15.55	11.1%	$ 3.94	$ 0.54
TOTAL	**2763**	**169.2**	**-2.2%**	**$ 7,564**	**$2,995**	**$ 10,558**	**23.1%**				

After modelling changes in excise rates consistent with scenario 9, 100,000 DALYs are averted (95 per cent UI: 85,000–120,000 DALYs averted). The cost of implementing scenario 9 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $1.5 billion in cost offsets to the healthcare system (UI: –$2.1 billion to –$940 million). The net cost of implementing scenario 9 is estimated at a saving of $1.5 billion (UI: –$2.1 billion to –$920 million). The results are presented in Figure 11, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 9 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 11: Cost-effectiveness plane of scenario 9



Scenario 10: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 7 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops

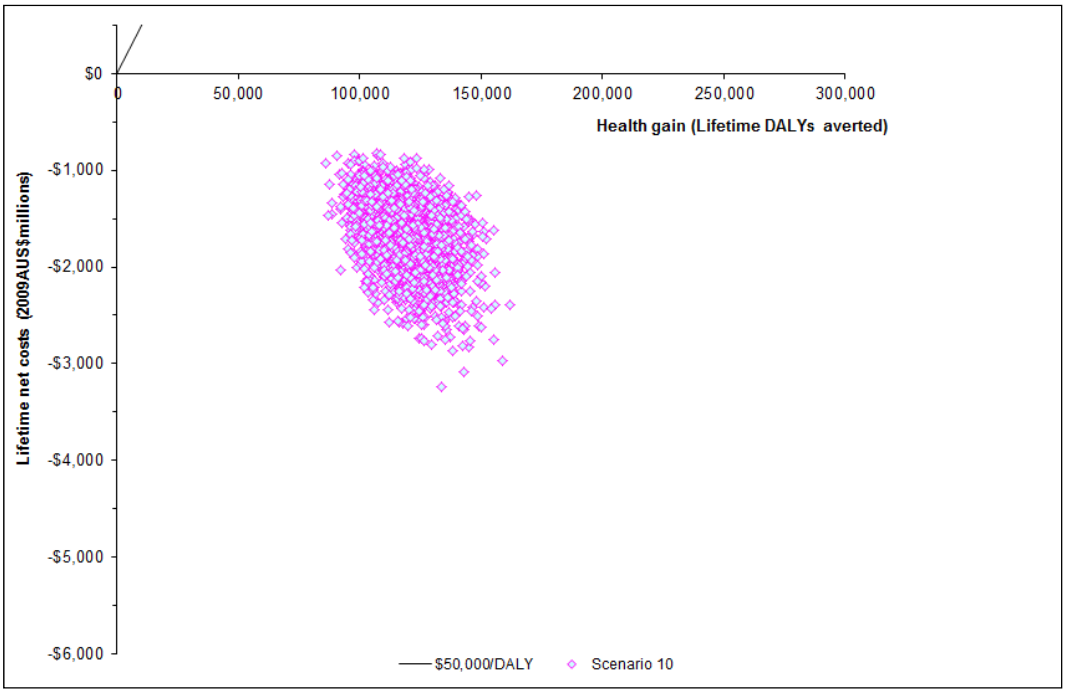
Scenario 10 applies a two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 7 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits. Table 16 provides data on the quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 2.6 per cent, with a 26.6 per cent increase in the amount of taxation collected. The price of wine, fortified wine and cider increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales. The price of beer, spirits and alcopops remains the same. The excise tax per standard drink for fortified wine increases from $0.10 under the base-case scenario to $1.55 under scenario 10.

Table 16: Scenario 10 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	130.3	4.17	2.6%	$ 104	$ 53	$ 158	2.6%	$ 4.49	0%	$ 1.78	$ 0.32
Low-strength beer -onsite	30.7	0.98	4.0%	$ 10	$ 38	$ 48	4.0%	$ 13.52	0%	$ 5.36	$ 0.14
Hig-strength beer offsite	1491.1	68.59	1.9%	$ 2,213	$ 723	$ 2,936	6.4%	$ 5.34	1.6%	$ 1.47	$ 0.41
High-strength beer -onsite	351.4	16.16	3.3%	$ 367	$ 508	$ 875	5.8%	$ 15.89	0.4%	$ 4.38	$ 0.29
Wine -offsite	240.0	29.81	-29.0%	$ 1,937	$ 406	$ 2,343	156.5%	$ 18.60	61.1%	$ 1.90	$ 0.82
Wine -onsite	75.3	9.35	-5.9%	$ 607	$ 334	$ 942	116.0%	$ 48.85	16.9%	$ 4.99	$ 0.82
Fortified wine -offsite	0.1	0.02	-99.1%	$ 3	$ 0.4	$ 3	-90.5%	$ 35.82	235.4%	$ 2.27	$ 1.55
Fortified wine -onsite	2.5	0.50	-22.4%	$ 61	$ 14	$ 75	364.7%	$ 63.79	65.0%	$ 4.04	$ 1.55
Spirits -offsite	47.1	16.41	1.7%	$ 1,135	$ 214	$ 1,348	1.7%	$ 49.97	0%	$ 1.82	$ 0.88
Spirits -onsite	15.5	5.41	0.3%	$ 374	$ 190	$ 565	0.3%	$134.73	0%	$ 4.90	$ 0.88
Alcopops -offsite	210.6	8.82	0.8%	$ 610	$ 230	$ 840	0.8%	$ 12.02	0%	$ 3.63	$ 0.87
Alcopops -onsite	117.1	4.91	-0.6%	$ 339	$ 264	$ 603	-0.6%	$ 24.78	0%	$ 7.49	$ 0.88
Cider -offsitef	29.4	1.47	-9.9%	$ 65	$ 19	$ 84	109.8%	$ 7.13	29.6%	$ 1.81	$ 0.56
Cider -onsite	10.7	0.53	-1.8%	$ 24	$ 15	$ 39	78.3%	$ 15.63	11.6%	$ 3.96	$ 0.56
TOTAL	**2751.8**	**167.14**	**-2.6%**	**$ 7,850**	**$3,009**	**$ 10,859**	**26.6%**				

After modelling changes in excise rates consistent with scenario 10, 120,000 DALYs are averted (95 per cent UI: 98,000–140,000 DALYs averted). The cost of implementing scenario 10 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $1.7 billion in cost offsets to the healthcare system (UI: –$2.5 billion to –$1.1 billion). The net cost of implementing scenario 10 is estimated at a saving of $1.7 billion (UI: –$2.5 billion to –$1 billion). The results are presented in Figure 12, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 10 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 12: Cost-effectiveness plane of scenario 10



Scenario 11: Two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 10 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops

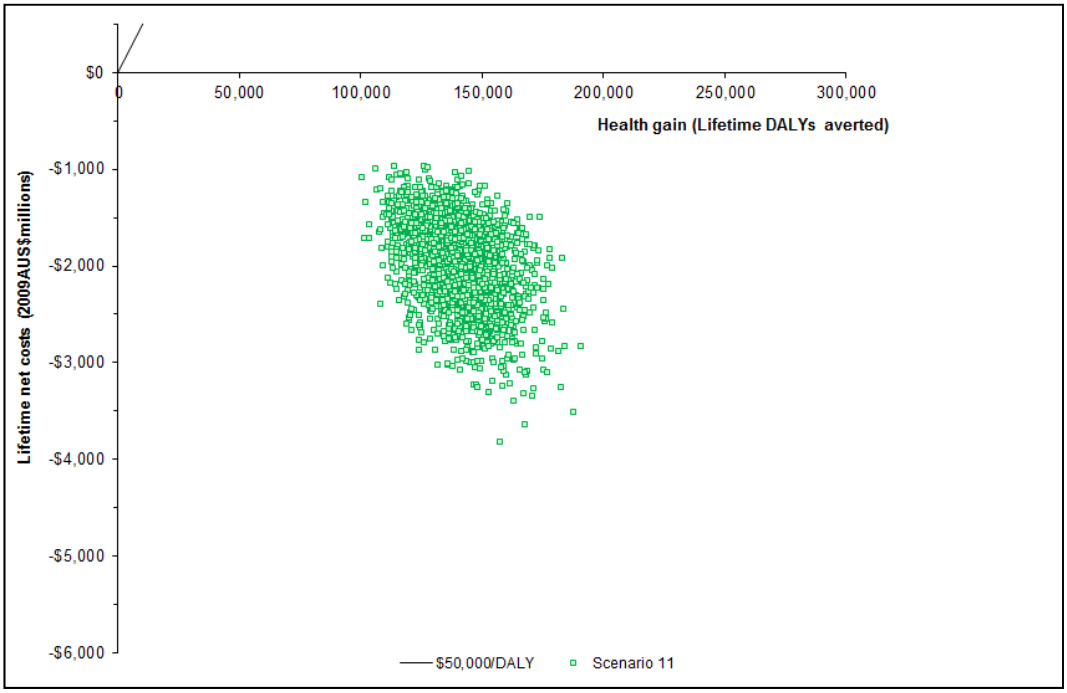
Scenario 11 applies a two-tiered tax system. The first tier applies a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 10 per cent for every per cent increase in alcohol content above 3.2 per cent; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits. Table 17 provides data on quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption falls by 3 per cent, with a 32.4 per cent increase in the amount of taxation collected. The price of wine, fortified wine and cider increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales (with the exception of fortified wine sold offsite, which ceases to be consumed). The price of spirits and alcopops remains the same, with a small increase in the price of high-strength beer sold offsite. The excise tax per standard drink for wine increases from $0.17 under the base-case scenario, to $1.01 under scenario 11.

Table 17: Scenario 11 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	132	4.2	3.8%	$ 106	$ 54	$ 159	3.8%	$ 4.49	0%	$ 1.78	$ 0.32
Low-strength beer -onsite	31	1.0	5.7%	$ 11	$ 38	$ 49	5.7%	$ 13.52	0%	$ 5.36	$ 0.14
High-strength beer -offsite	1502	69.1	2.7%	$ 2,316	$ 737	$ 3,053	10.7%	$ 5.40	2.8%	$ 1.49	$ 0.42
High-strength beer -onsite	356	16.4	4.7%	$ 387	$ 516	$ 903	9.2%	$ 15.94	0.7%	$ 4.39	$ 0.30
Wine -offsite	214	26.5	-36.8%	$ 2,123	$ 401	$ 2,524	176.3%	$ 20.65	78.9%	$ 2.11	$ 1.01
Wine -onsite	74	9.2	-7.7%	$ 733	$ 342	$ 1,075	146.6%	$ 50.90	21.8%	$ 5.19	$ 1.01
Fortified wine -offsite	0	0.0	-100.0%	$ -	$ -	$ -	-100.0%	$ 51.68	384.0%	$ 3.27	$ -
Fortified wine -onsite	2	0.4	-36.5%	$ 79	$ 15	$ 94	479.7%	$ 79.65	106.1%	$ 5.05	$ 2.46
Spirits -offsite	47	16.5	2.4%	$ 1,142	$ 215	$ 1,358	2.4%	$ 49.97	0%	$ 1.82	$ 0.88
Spirits -onsite	16	5.4	0.2%	$ 374	$ 190	$ 564	0.2%	$134.73	0%	$ 4.90	$ 0.88
Alcopops -offsite	212	8.9	1.4%	$ 614	$ 231	$ 845	1.4%	$ 12.02	0%	$ 3.63	$ 0.87
Alcopops -onsite	117	4.9	-1.0%	$ 338	$ 263	$ 601	-1.0%	$ 24.78	0%	$ 7.49	$ 0.88
Cider -offsite	30	1.5	-9.5%	$ 69	$ 19	$ 88	119.9%	$ 7.26	31.9%	$ 1.84	$ 0.59
Cider -onsite	11	0.5	-0.6%	$ 25	$ 15	$ 41	86.6%	$ 15.75	12.5%	$ 3.99	$ 0.59
TOTAL	**2742**	**164.5**	**-3.0%**	**$ 8,316**	**$3,038**	**$ 11,354**	**32.4%**				

After modelling changes in excise rates consistent with scenario 11, 140,000 DALYs are averted (95 per cent UI: 110,000–170,000 DALYs averted). The cost of implementing scenario 11 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $2 billion in cost offsets to the healthcare system (UI: –$2.9 billion to –$1.2 billion). The net cost of implementing scenario 11 is estimated at a saving of $2 billion (UI: -–$2.9 billion to –$1.2 billion). The results are presented in Figure 13, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 11 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 13: Cost-effectiveness plane of scenario 11



Scenario 12: Two-tiered tax system. The first tier adopts the current excise rate on low-strength beer and varies taxation rates for higher alcohol content beverages, such that total taxation receipts remain unchanged from base case; the second tier applies the current excise applicable to spirits and alcopops

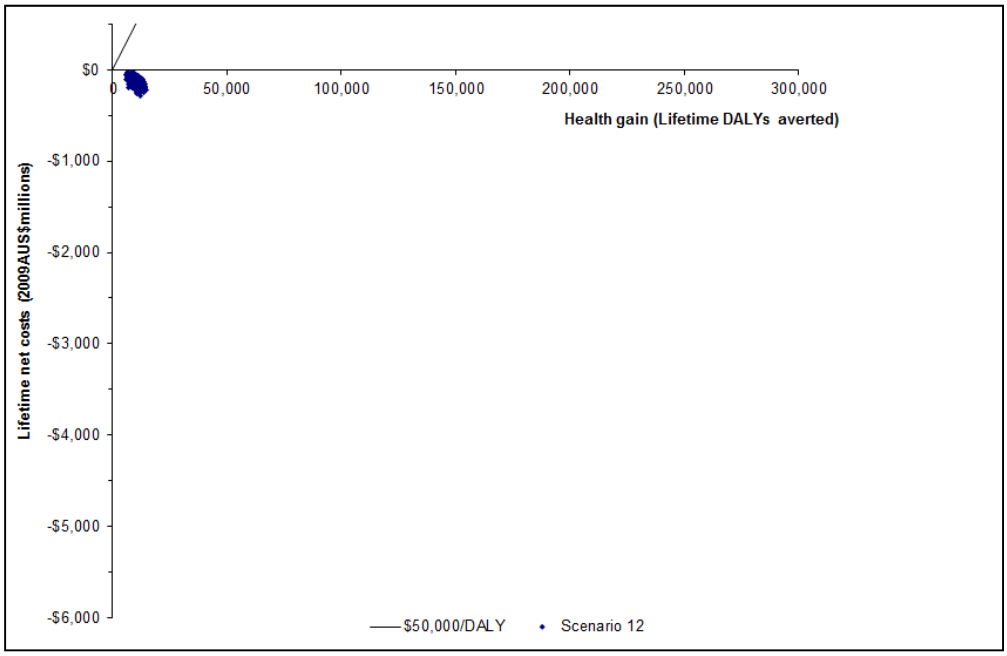
Scenario 12 applies a two-tiered tax system. The first tier adopts the current excise rate on low-strength beer, and varies taxation rates for higher alcohol-content beverages, such that total taxation receipts remains unchanged from base case; the second tier applies the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages, except spirits. Table 18 provides data on the quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption increases by 3.4 per cent, with a 0 per cent change in the amount of taxation collected. The price of beer is lower, which increases consumption and reduces taxation revenue collected from these sales. The price of spirits and alcopops remains the same. The price of wine, fortified wine and cider increases, which has the dual effect of reducing the consumption of these beverage types and increasing the taxation revenue collected from these sales (with the exception of a decline in taxation revenue from fortified wine sold offsite). The excise tax per standard drink changes for most beverages, from $0.14 (base case) to $0.06 for low-strength beer sold onsite, from $0.39 (base case) to $0.20 for high-strength beer sold offsite and from $0.17 (base case) to $0.48 for wine.

Table 18: Scenario 12 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	136	4.3	7.0%	$ 51	$ 50	$ 101	-34.2%	$ 4.02	-10.4%	$ 1.59	$ 0.15
Low-strength beer -onsite	30	1.0	2.5%	$ 5	$ 37	$ 42	-10.4%	$ 13.32	-1.5%	$ 5.28	$ 0.06
High-strength beer -offsite	1597	73.5	9.2%	$ 1,161	$ 654	$ 1,815	-34.2%	$ 4.50	-14.3%	$ 1.24	$ 0.20
High-strength beer -onsite	352	16.2	3.5%	$ 180	$ 490	$ 670	-19.0%	$ 15.31	-3.3%	$ 4.22	$ 0.14
Wine -offsite	292	36.2	-13.7%	$ 1,365	$ 395	$ 1,760	92.7%	$ 14.87	28.8%	$ 1.52	$ 0.48
Wine -onsite	78	9.7	-2.8%	$ 364	$ 319	$ 682	56.5%	$ 45.12	8.0%	$ 4.60	$ 0.48
Fortified wine -offsite	1	0.3	-90.1%	$ 25	$ 4	$ 28	-17.2%	$ 29.11	172.6%	$ 1.84	$ 1.16
Fortified wine -onsite	3	0.5	-16.4%	$ 49	$ 14	$ 63	289.0%	$ 57.08	47.7%	$ 3.62	$ 1.16
Spirits -offsite	47	16.2	0.6%	$ 1,122	$ 212	$ 1,334	0.6%	$ 49.97	0%	$ 1.82	$ 0.88
Spirits -onsite	15	5.4	-0.4%	$ 372	$ 189	$ 561	-0.4%	$134.73	0%	$ 4.90	$ 0.88
Alcopops -offsite	210	8.8	0.7%	$ 609	$ 230	$ 839	0.7%	$ 12.02	0%	$ 3.63	$ 0.87
Alcopops -onsite	117	4.9	-0.6%	$ 339	$ 264	$ 603	-0.6%	$ 24.78	0%	$ 7.49	$ 0.88
Cider -offsite	32	1.6	-1.7%	$ 35	$ 17	$ 52	30.7%	$ 5.91	7.3%	$ 1.50	$ 0.28
Cider -onsite	11	0.5	0.1%	$ 12	$ 14	$ 26	20.4%	$ 14.40	2.9%	$ 3.65	$ 0.28
TOTAL	**2921**	**179.1**	**3.4%**	**$ 5,689**	**$2,886**	**$ 8,576**	**0.0%**				

After modelling changes in excise rates consistent with scenario 12, 9,900 DALYs are averted (95 per cent UI: 7,300–13,000 DALYs averted). The cost of implementing scenario 12 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $140 million in cost offsets to the healthcare system (UI: –$220 million to –$77 million). The net cost of implementing scenario 12 is estimated at a saving of $120 million (UI: –$200 million to –$55 million). The results are presented in Figure 14, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 12 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 14: Cost-effectiveness plane of scenario 12



Scenario 13: Removing the current WET on wine, fortified wine and cider, and applying an excise rate equivalent to low-strength offsite beer for these beverages

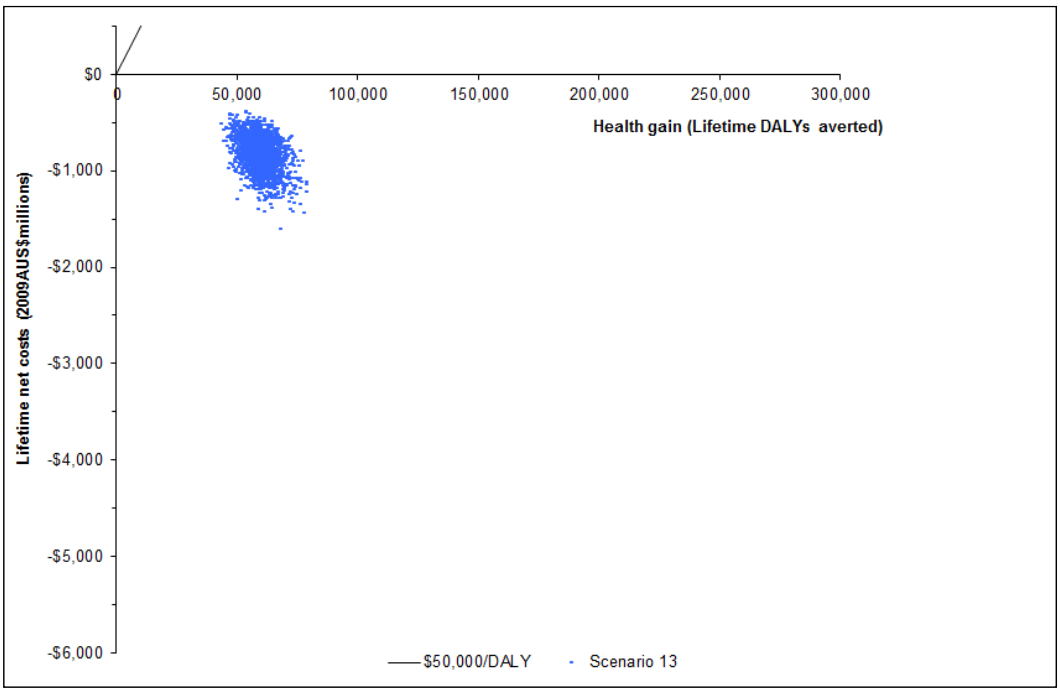
In scenario 13, we model the removal of the WET, and apply an excise rate equivalent to low-strength offsite beer for these beverages subject to the WET. Table 19 provides data on quantity of alcohol consumed by litre and pure alcohol; amount of excise, GST and total tax received; price per litre, per standard drink and excise tax per standard drink; and change in quantity consumed, tax collected and price per litre for each alcoholic beverage. Overall consumption is reduced by 1.3 per cent, with a 15.4 per cent change in the amount of taxation collected. The price of wine, fortified wine and cider all increases, which has the dual effect of reducing consumption and increasing taxation revenue collected from these sales. The majority of the additional taxation revenue comes from the higher price (and higher effective tax) on wine sales.

Table 19: Scenario 13 results

Beverage	Quantity consumed (/1,000 litres)	Quantity consumed (/1,000 litres pure alcohol)	Change in quantity consumed	Excise tax collected ($m)	GST ($m)	Total tax collected ($m)	Change in tax collected	Price per litre	Change in price per litre	Price per standard drink	Excise tax per standard drink
Low-strength beer -offsite	128	4.1	1.1%	$ 103	$ 52	$ 155	1.1%	$ 4.49	0%	$ 1.78	$ 0.32
Low-strength beer -onsite	30	1.0	1.8%	$ 10	$ 37	$ 47	1.8%	$ 13.52	0%	$ 5.36	$ 0.14
High-strength beer -offsite	1479	68.0	1.1%	$ 2,082	$ 706	$ 2,789	1.1%	$ 5.25	0%	$ 1.45	$ 0.39
High-strength beer -onsite	345	15.9	1.5%	$ 343	$ 497	$ 840	1.5%	$ 15.84	0%	$ 4.36	$ 0.27
Wine -offsite	288	35.8	-14.8%	$ 1,399	$ 395	$ 1,794	96.4%	$ 15.07	30.5%	$ 1.54	$ 0.50
Wine -onsite	78	9.6	-2.9%	$ 377	$ 320	$ 697	59.9%	$ 45.32	8.4%	$ 4.62	$ 0.50
Fortified wine -offsite	9	1.8	-33.0%	$ 71	$ 15	$ 86	152.6%	$ 17.60	64.9%	$ 1.12	$ 0.50
Fortified wine -onsite	3	0.6	-6.1%	$ 24	$ 13	$ 36	122.8%	$ 45.58	17.9%	$ 2.89	$ 0.50
Spirits -offsite	47	16.3	0.8%	$ 1,125	$ 212	$ 1,337	0.8%	$ 49.97	0%	$ 1.82	$ 0.88
Spirits -onsite	16	5.4	0.3%	$ 375	$ 190	$ 565	0.3%	$134.73	0%	$ 4.90	$ 0.88
Alcopops -offsite	209	8.8	0.2%	$ 606	$ 229	$ 835	0.2%	$ 12.02	0%	$ 3.63	$ 0.87
Alcopops -onsite	118	4.9	-0.1%	$ 341	$ 265	$ 606	-0.1%	$ 24.78	0%	$ 7.49	$ 0.88
Cider -offsite	30	1.5	-9.4%	$ 58	$ 18	$ 76	90.4%	$ 6.85	24.6%	$ 1.74	$ 0.50
Cider -onsite	11	0.5	-2.9%	$ 21	$ 15	$ 35	62.8%	$ 15.35	9.7%	$ 3.89	$ 0.50
TOTAL	**2790**	**174.2**	**-1.3%**	**$ 6,935**	**$2,964**	**$ 9,899**	**15.4%**				

After modelling changes in excise rates consistent with scenario 13, 59,000 DALYs are averted (95 per cent UI: 48,000–71,000 DALYs averted). The cost of implementing scenario 13 is estimated at $22 million (UI: $14 million–$32 million), with the potential to produce an estimated $840 million in cost offsets to the healthcare system (UI: –$1.2 billion to –$530 million). The net cost of implementing scenario 13 is estimated at a saving of $820 million (UI: –$1.2 billion to –$510 million). The results are presented in Figure 15, and are scattered in the south-east quadrant of the cost-effectiveness plane, suggesting that scenario 13 is dominant in 100 per cent of cases, and is a cost-effective option in 100 per cent of cases compared to current practice.

Figure 15: Cost-effectiveness plane of scenario 13



Summary of all scenarios

Table 20 provides a summary of results for each scenario, and Figure 16 graphs the results on a cost-effectiveness plane. The key finding from this research suggests that any variation to the current rates of alcohol excise is a cost-effective healthcare intervention. All of the modelled scenarios are cost-effective, and are classified as being dominant in comparison to current practice (i.e. they save more money and are more effective in reducing alcohol-related harm than what is currently being achieved). By reassessing the rates of alcohol excise, the government is able to improve health, avert healthcare costs and substantially increase the amount of alcohol excise tax collected.

Scenario 3 (applying a universal tax rate on alcoholic beverages equivalent to a 10 per cent increase in the current excise applicable to spirits and alcopops, with a duty-free threshold of 1.15 per cent applicable to all beverages except spirits) appears to be the preferred option. Overall alcohol consumption would decrease by 10.6 per cent, 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 a year. 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. Furthermore, under this scenario, overall taxation revenue is estimated to increase by 49.8 per cent, or an additional $4.27 billion per year. This scenario, however, does not address the inefficiencies of the current taxation system; it merely increases the tax for each beverage. Further, this scenario is not conducive to the NAAA principles of alcohol reform in Australia, namely that the approach to alcohol taxation should be volumetric, with tax increasing for products with higher alcohol volumes, and changes to tax should not be designed to produce a decrease in price of alcohol products, other than for low-alcohol products.

The most effective scenario, consistent with the NAAA principles, is scenario 11: a two-tiered tax system, with the first tier applying a tax rate on alcoholic beverages (except spirits and alcopops) that increases exponentially by 10 per cent for every per cent increase in alcohol content above 3.2 per cent; and the second tier applying the current excise applicable to spirits and alcopops. Overall alcohol consumption would decrease by 3 per cent, resulting in 140,000 DALYs being averted. The amount of alcohol-related disease and injury prevented in this scenario would save the health system $2 billion a year, and overall receipts from alcohol excise would increase by 32.4 per cent, or an additional $2.78 billion per year. This scenario keeps the cost of a low-alcohol standard drink at the same level with a subsequent increase in higher-alcohol content beverages.

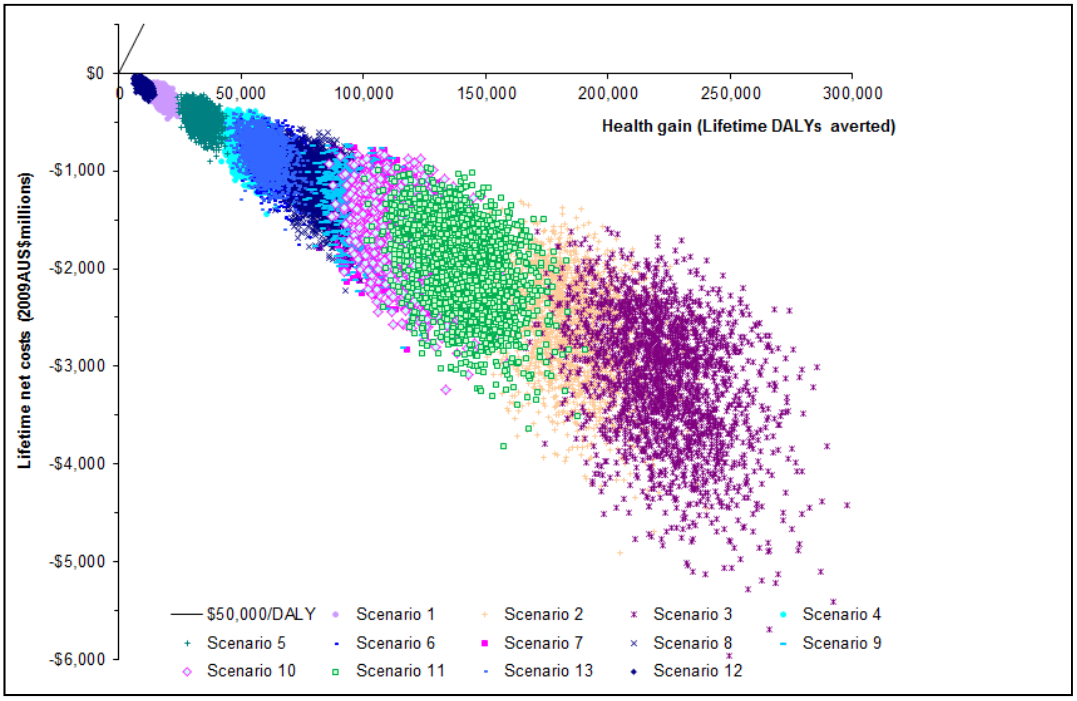
The results for scenarios 1 and 13 are also worth noting. Scenario 1, which applies a universal excise tax rate on alcoholic beverages equal to the current excise rate applicable to high-strength beer sold offsite, is the model of volumetric taxation recommended in the Henry Review (The Treasury 2009a). However, scenario 1 does not conform to the NAAA principles, given the substantial reductions in price of spirits and alcopops. Scenario 13 involves a removal of the current WET, and applying an excise rate equivalent to low-strength offsite beer for these beverages subject to the WET. This scenario would reduce overall alcohol consumption by 1.3 per cent, avert 59,000 DALYs, save the health system $820 million a year and increase receipts from alcohol excise by an additional $1.3 billion per year. Although this scenario might not be readily accepted by the wine industry, the wine industry is currently in a state of transition, and any changes to the WET could be factored into their product portfolio. Further, any additional adjustments to the excise rate applied to the alcohol content of wine might create an incentive for the wine industry to diversify their portfolio into the manufacture of products with low alcohol content.

Overall, our research findings reinforce Australian and international literature that suggests taxation is a cost-effective strategy to reduce the burden of harm associated with alcohol use. Our previous research suggests that a more equitable and efficient tax system is required. Removing the WET and adjusting current excise rates to reflect the alcohol content of each beverage provides an opportunity to improve on the equity and efficiency of the taxation system; however, it is also necessary to remove the other distortions to the taxation system, such as duty-free and onsite discounts, which impact on the ability of price and tax to alleviate the burden of harm from alcohol misuse in Australia.

Table 20: Summary results for scenarios 1–13

Scenario	Mean DALYs averted	Cost offsets ($million)	Net costs ($million)	Quantity consumed (/1,000 litres)	Change in quantity consumed (from base case)	Total tax collected ($m)	Change in total tax collected (from base case)
Base case				2,826	0%	$ 8,576	0%
Scenario 1	18,000 (14,000 – 21,000)	-$250 (-$370 to -$150)	-$230 (-$350 to -$130)	2,810	-0.6%	$ 8,933	4.2%
Scenario 2	180,000 (150,000 – 220,000)	-$2,600 (-$3,800 to -$1,700)	-$2,600 (-$3,700 to -$1,600)	2,583	-8.6%	$ 12,195	42.2%
Scenario 3	220,000 (180,000 – 270,000)	-$3,200 (-$4,600 to -$2,000)	-$3,100 (-$4,600 to -$2,000)	2,528	-10.6%	$ 12,848	49.8%
Scenario 4	54,000 (44,000 – 65,000)	-$760 (-$1100 to -$490)	-$740 (-$1,100 to -$470)	2,795	-1.1%	$ 9,703	13.2%
Scenario 5	33,000 (27,000 – 40,000)	-$470 (-$700 to -$300)	-$450 (-$670 to -$270)	2,812	-0.5%	$ 9,138	6.6%
Scenario 6	65,000 (53,000 – 78,000)	-$920 (-$1,300 to -$590)	-$900 (-$1,300 to -$570)	2,800	-0.9%	$ 9,578	11.7%
Scenario 7	110,000 (87,000 – 130,000)	-$1,500 (-$2,200 to -$960)	-$1,500 (-$2,100 to -$940)	2,786	-1.4%	$ 9,951	16.0%
Scenario 8	83,000 (68,000 – 99,000)	-$1,200 (-$1,700 to -$750)	-$1,200 (-$1,700 to -$730)	2,778	-1.7%	$ 10,272	19.8%
Scenario 9	100,000 (85,00 0 – 120,000)	-$1,500 (-$2,100 to -$940)	-$1,500 (-$2,100 to -$920)	2,763	-2.2%	$ 10,558	23.1%
Scenario 10	120,000 (98,000 – 140,000)	-$1,700 (-$2,500 to -$1,100)	-$1,700 (-$2,500 to -$1,000)	2,752	-2.6%	$ 10,859	26.6%
Scenario 11	140,000 (110,000 – 170,000)	-$2,000 (-$2,900 to -$1,200)	-$2,000 (-$2,900 to -$1,200)	2,742	-3.0%	$ 11,354	32.4%
Scenario 12	9,900 (7,300 – 13,000)	-$140 (-$220 to -$77)	-$120 (-$200 to -$55)	2,921	3.4%	$ 8,576	0%
Scenario 13	59,000 (48,000 – 71,000)	-$840 (-$1,200 to -$530)	-$820 (-$1,200 to -$510)	2,790	-1.3%	$ 9,899	15.4%

Figure 16: Cost-effectiveness plane of scenario 1–13 results



Examining the evidence relating to the link between alcohol products deemed to be of higher risk or creating additional harms in the community

A search was undertaken for published articles investigating the different degrees of harm associated with the consumption of different alcoholic beverage types. Eleven electronic databases were interrogated: Australian Medical Index, ABI/INFORM Global, Medline, Embase, Project Cork, PsycINFO, CINAHL, DRUG, Science Direct, Scopus and Web of Science. The search was limited to articles published from 2000 to 2011.

Close to 100 published articles were identified, with 36 being used in this review: 12 for cancer (Albertsen & Gronbaek 2002; Bongaerts et al. 2008; Castellsague et al. 2004; Chao 2007; Key et al. 2006; Klatsky et al. 2009; Kristiansen et al. 2008; Levitan et al. 2005; Park et al. 2009; Pedersen et al. 2003; Petti & Scully 2006; Razvodovsky 2003), five for cardiovascular or coronary heart disease (Brien et al. 2011; Burke et al. 2007; Di Castelnuovo et al. 2002; Marques-Vidal et al. 2004; Volcik et al. 2008), five for cognitive function and dementia (Arntzen et al. 2010; Corley et al. 2011; Letenneur 2004; Letenneur 2007; Luchsinger et al. 2004), two for homicide (Mann et al. 2006; Rosso 2001), nine for mortality (Andreasson et al. 2006; Baglietto et al. 2006; Gronbaek et al. 2000; Harris et al. 2007; Johansen et al. 2005; Kerr et al. 2000; Poikolainen et al. 2002; Razvodovsky 2003; Strandberg et al. 2007) and three for suicide (Landberg 2009; Razvodovsky 2009; Sher 2005).

A decision was made to include cancer, cardiovascular and coronary heart disease, cognitive function and dementia, homicide, mortality and suicide, because these categories of harm were represented by a number of published articles and were deemed of most interest. The articles not included in this synthesis focused on accidents and injuries (Plugge et al. 2001; Skog 2001; Son & Topyan 2011; Watt et al. 2004; Watt et al. 2005; Watt et al. 2006), body mass index (Lukasiewicz et al. 2005), bone density (Yin et al. 2011), cirrhosis (Pelletier 2002), diabetes (Conigrave et al. 2001; Harding et al. 2002), drink drinking (Gruenewald et al. 2000; Mann et al. 2006), high-risk drinking (Afitska et al. 2008; Baltieri et al. 2009; Chung 2004; Clapp & Shillington 2001; Flensborg-Madsen et al. 2008; Gronbaek et al. 2000; Jensen et al. 2002; Kuntsche et al. 2006; Lintonen & Konu 2001; Lintonen & Konu 2003; McCreary 2002; Mohler-Kuo et al. 2004; Siegel et al. 2011; Werch et al. 2006), hypertension (Núñez-Córdoba et al. 2009), serum uric acid (Choi & Curhan 2004; Gaffo et al. 2010), sick-day absences (Norström & Moan 2009), stroke (Malarcher et al. 2001; Mukamal et al. 2005) and subjective heath (Guallar-Castillon 2001).

Table 21 presents a summary of the reviewed articles.

Table 21: Evidence relating to the link between alcohol products deemed to be of higher risk or creating additional harms in the community

Reference	Country	Harm	Design	Sample	Sample age range in years (%, male)	Effect
Albertsen & Gronbaek 2002	Denmark	Cancer (prostate)	Cohort	Patients from the Copenhagen Male Study	20–98 (100%)	Type of alcohol was not associated with the risk of prostate cancer
Bongaerts et al. 2008	The Netherlands	Cancer (colorectal)	Cohort	Colorectal cases	55–69 (48%)	Type of alcohol was not associated with the risk of colorectal cancer
Castellsague et al. 2004	Spain	Cancer (oral)	Case control	Hospital patients newly diagnosed with oral cancer, and matched controls	mean=60 (81%)	Drinking spirits was associated with an increased risk of oral cancer
Chao 2007	N/A	Cancer (lung)	Meta-analysis	17 unique studies	N/A	Drinking beer and spirits was associated with an increased risk of lung cancer in men. Drinking wine had an inverse relationship with lung cancer risk
Key et al. 2006	N/A	Cancer (breast)	Meta-analysis	98 unique studies	N/A	Type of alcohol was not associated with the risk of breast cancer
Klatsky et al. 2009	USA	Cancer (non-Hodgkin's lymphoma and hematologic malignancies)	Cohort	Multiethnic population	mean=41 (44%)	Type of alcohol was not associated with the risk of non-Hodgkin's lymphoma and hematologic malignancies
Kristiansen et al. 2008	Denmark	Cancer (pancreatitis)	Data linkage	Patients from the Copenhagen City Heart Study	mean=50 (47%)	Drinking beer was associated with an increased risk of pancreatitis
Levitan et al. 2005	USA	Cancer (plasma concentration of high-sensitivity C-reactive protein)	Quasi experimental	Patients from the Women's Health Study who had never used postmenopausal hormones	39–38 (0%)	Type of alcohol was not associated with high-sensitivity C-reactive protein
Park et al. 2009	UK	Cancer (colorectal)	Cohort	Prospective population living in Norfolk	40–79 (45%)	Drinking wine was inversely associated with the risk of colorectal cancer

Pedersen et al. 2003	Denmark	Cancer (colorectal)	Cohort	Patients from the Copenhagen City Heart Study, the Copenhagen County Centre of Preventive Medicine, the Copenhagen Male Study	23–95 (53%)	Drinking beer and spirits, but not wine, was associated with an increased risk of rectal cancer. Drinking the same amount of alcohol, but including more than 30% wine reduced the risk of rectal cancer, but it was still elevated compared to non-drinkers
Petti & Scully 2006	Italy	Cancer (leukoplakia)	Case control	Leukoplakia patients and matched controls	40–65 (62%)	Drinking wine or spirits was associated with an increased risk of leukoplakia. A statistically-significant interaction between drinking wine and heavy smoking was also found
Razvodovsky 2003a	Belarus	Cancer (mouth and pharynx, oesophagus, stomach, breast)	Time series	Cancer rates and per capita alcohol consumption data	N/A	The analysis suggests that a 1% increase in strong spirits consumption per capita would result in a 0.45% increase in the breast cancer mortality rate, and in a 0.66% increase in the oesophagus cancer mortality rate
Brien et al. 2011	N/A	Heart (coronary heart disease markers)	Meta-analysis	44 unique studies	N/A	Type of alcohol was not associated with the coronary heart disease markers
Burke et al. 2007	Australia	Heart (coronary heart disease and cardiovascular disease)	Cohort	Indigenous Australians	15–88 (50%)	Drinking wine was inversely associated with coronary heart disease
Di Castelnuovo et al. 2002	N/A	Heart (vascular risk)	Meta-analysis	26 unique studies	N/A	Drinking wine had an inverse relationship with vascular risk
Marques-Vidal et al. 2004	Northern Ireland & France	Heart (coronary heart disease)	Cohort	Men free from coronary heart disease	NR (100%)	Type of alcohol was not associated with the risk of cardiovascular disease
Volcik et al. 2008	USA	Heart (coronary heart disease)	Cohort	Atherosclerosis Risk in Communities Study	45–64 (45%)	Type of alcohol was not associated with the risk of coronary heart disease

Arntzen et al. 2010	Norway	Cognitive function	Cohort	Stroke-free men and women	mean=59 for males & mean=58 for females (44%)	Drinking wine was associated with better performance on all cognitive tests in men and women. Alcohol abstention was associated with lower cognitive performance in women
Corley et al. 2011	UK	Cognitive function	Cohort	Lothian Birth Cohort 1936	mean=70 (48%)	Drinking wine was associated with better memory in women. For men, drinking wine and sherry–port was associated with better verbal ability; drinking beer was associated with poorer verbal ability; drinking spirits was associated with better memory
Letenneur 2004	N/A	Cognitive function (dementia)	Review	NR	N/A	Type of alcohol was not associated with dementia
Letenneur 2007	N/A	Cognitive function (dementia)	Review	NR	N/A	Drinking wine has an inverse relationship with the risk of dementia
Luchsinger et al. 2004	USA	Cognitive function (dementia)	Cohort	Elderly people	mean=73 (33%)	Drinking wine had an inverse relationship with the risk of Alzheimer's disease. The association was confined to individuals without the APOE ε4 allele
Mann et al. 2006b	Canada	Homicide	Time series	Homicide rates and alcohol consumption data	15+ (N/A)	Drinking beer and spirits was associated with homicide rates for the total population and males
Rosso 2001	14 European countries	Homicide	Time series	Homicide rates and alcohol sales data	15+ (N/A)	Pooled estimates showed that beer sales were positively and significantly associated with homicide rates in all three European regions, whereas wine sales were positively and moderately associated with homicide rates only in southern Europe

Andreasson et al. 2006	Sweden	Mortality (liver cirrhosis, alcoholic psychosis, alcoholism, alcohol poisoning, accident mortality, suicide, homicide, assaults, sick-day absences)	Time series	Rates of alcohol harm and per capita alcohol consumption data	15+ (N/A)	A tax cut by 40% on spirits and 15% on wine is estimated to increase total per capital alcohol consumption by 0.35 litres. This increase is estimated to cause 289 additional deaths, 1627 additional assaults and 1.6 million additional sick-day absences
Baglietto et al. 2006	Australia	Mortality (all-cause)	Cohort	The Melbourne Collaborative Cohort Study	27–75 (41%)	Drinking wine was inversely associated with mortality for men and women. Drinking beer was associated with an increased risk in men, but not women
Gronbaek et al. 2000a	Denmark	Mortality (all-cause, coronary heart disease, cancer)	Cohort	Copenhagen City Heart Study, Copenhagen County Centre of Preventive Medicine cohort, Copenhagen Male Study	20–98 (53%)	Heavy drinkers who avoided wine were at higher risk of death from all causes than heavy drinkers who included wine in their alcohol intake. Wine drinkers had significantly lower mortality from both coronary heart disease and cancer than non-wine drinkers
Harris et al. 2007	Australia	Mortality (coronary heart disease and cardiovascular disease)	Cohort	The Melbourne Collaborative Cohort Study	40–69 (40%)	Drinking wine was inversely associated with mortality for women
Johansen et al. 2005	Denmark	Mortality (all-cause)	Cohort	Copenhagen City Heart Study	20+ (45%)	Drinking wine or spirits was associated with lower mortality than beer drinking, but when non-drinkers were categorised separately, there was no indication of a beneficial influence of low-alcohol intake on mortality
Kerr et al. 2000	Australia, Canada, NZ, UK, USA	Mortality (cirrhosis)	Time series	All-cause cirrhosis mortality rates and per capita alcohol consumption data	N/A	Drinking spirits was associated with an increased risk of cirrhosis mortality
Poikolainen et al. 2002	Finland	Mortality (alcohol poisoning)	Time series	Autopsy data and alcohol sales data	N/A	1% increase in the sales of spirits increases the number of fatal alcohol poisonings by 0.4%

Razvodovsky 2003b	Belarus	Mortality (violent)	Time series	Violent mortality rates and per capita alcohol consumption data	N/A	A 10% increase in spirits consumption per capita would result in a 7.5% increase in the accident and injury mortality rate, a 5% increase in the suicide rate, an 11.4% increase in the homicide rate and a 1% increase in the fatal traffic accident rate
Strandberg et al. 2007	Finland	Mortality (29-year)	Cohort	Businessmen and executives (mainly)	40–55 (100%)	Men with a preference for wine had the lowest total mortality, due to lower cardiovascular mortality. Drinking wine had an inverse relationship with mortality
Landberg 2009	USA	Suicide	Time series	Annual suicide rates and per capita alcohol consumption data	15+ (N/A)	Female suicide rates increase by approximately 16% if overall per capita spirits consumption increases by 1 litre
Razvodovsky 2009	Russia	Suicide	Time series	Suicide rates and alcohol sales data	N/A	A 1-litre increase in vodka sales would increase the suicide rate by 9% for men and 6% for women.
Sher 2005	34 European countries	Suicide	Correlation	Suicide rates and per capita alcohol consumption data	15–24 (N/A)	Per capita consumption of wine had an inverse relationship with suicide rates for males

APOE, xxx; N/A, not available; NR, xxx;

Cancer

Drinking spirits was associated with an increased risk of cancer, including oral (Castellsague et al. 2004; Razvodovsky 2003), lung (in men only) (Chao 2007), rectal (Pedersen et al. 2003), leukoplakia (Petti & Scully 2006) and breast (Razvodovsky 2003). Beer consumption was associated with lung cancer (in men only) (Chao 2007), pancreatitis (Kristiansen et al. 2008) and rectal cancer (Pedersen et al. 2003). Wine consumption was found to have a protective effect on lung cancer (Chao 2007) and colorectal cancer (Park et al. 2009; Pedersen et al. 2003); however, wine drinking did increase the risk of leukoplakia (Petti & Scully 2006). Six other studies did not find an association with alcohol products and cancer (breast (Key et al. 2006), prostate (Albertsen & Gronbaek 2002), colorectal (Bongaerts et al. 2008), non-Hodgkin's lymphoma and hematologic malignancies, (Klatsky et al. 2009) and plasma concentration of high-sensitivity C-reactive protein (Levitan et al. 2005).

Cardiovascular disease

No association was found between alcohol products consumed and coronary heart disease in three studies (Brien et al. 2011; Marques-Vidal et al. 2004; Volcik et al. 2008); however, one study did find an inverse relationship for wine drinkers (Burke et al. 2007). A meta-analysis of vascular risk and alcohol products also found an inverse relationship for drinking wine (Di Castelnuovo et al. 2002).

Cognitive function

Drinking wine was associated with better cognitive performance for men and women (Arntzen et al. 2010; Corley et al. 2011). The benefits of drinking wine were also reported for the risk of dementia in two studies (Letenneur 2007; Luchsinger et al. 2004), although one study noted that the protective effect was confined to individuals without the APOE ε4 allele (Luchsinger et al. 2004). No significant results were found for one study also investigating associations of alcohol products and dementia (Letenneur 2004). For men, sherry–port consumption was associated with better verbal ability, drinking beer was associated with poorer verbal ability and drinking spirits was associated with better memory (Corley et al. 2011).

Homicide

In Canada, spirit and beer consumption was associated with homicide rates for the total population and males (Mann et al. 2006). In Europe, beer sales were associated with homicide rates across all three regions studied, while wine sales were only associated with homicide rates in traditional wine-drinking cultures in southern Europe (Rosso 2001).

Mortality

Wine consumption reportedly had a protective effect on mortality caused by coronary heart disease and cardiovascular disease (Gronbaek et al. 2000; Harris et al. 2007; Strandberg et al. 2007), cancer mortality (Gronbaek et al. 2000) and all-cause mortality (Baglietto et al. 2006). Drinking beer was associated with an increased risk in all-cause mortality (for men only) (Baglietto et al. 2006). Spirit consumption increased the risk of cirrhosis mortality (Kerr et al. 2000), fatal alcohol poisonings (Poikolainen et al. 2002) and mortality resulting from

violent causes (Razvodovsky 2003). Tax cuts on spirits and wine were estimated to increase consumption, and therefore, elevate mortality and assault rates (Andreasson et al. 2006). One study did not find an association between alcohol product consumption and mortality (Johansen et al. 2005).

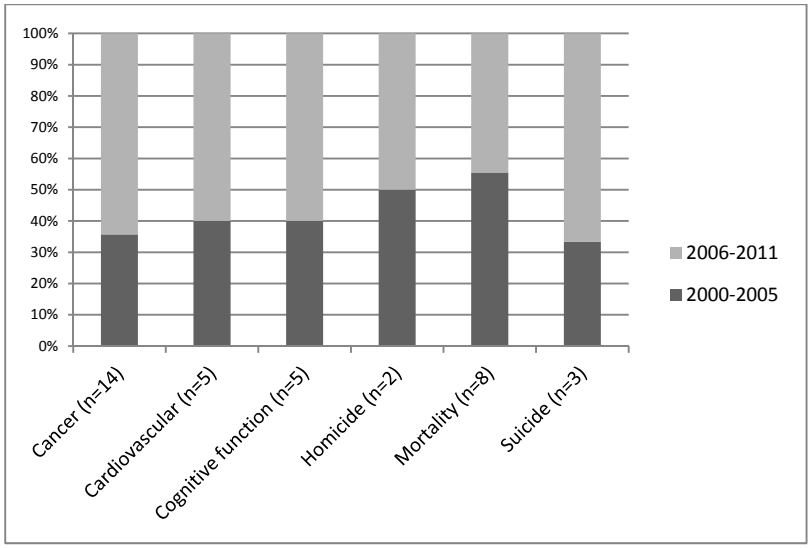
Suicide

Increased spirit consumption (per capita) was estimated to increase female suicide rates in the USA and Russia, and increase male suicide rates in Russia only (Landberg 2009; Razvodovsky 2009). In Europe, per capita wine consumption had an inverse relationship with suicide for males (Sher 2005).

Number of studies over time

The number of studies from 2000–2005 to 2006–2011 has increased for cancer, cardiovascular disease, cognition and dementia, and suicide; stayed the same for homicide; and decreased for mortality (Figure 17). This indicates that the evidence base appears to be increasing for alcohol-related diseases.

Figure 17: Number of articles published 2000-2005 and 2006-2011



Summary

The search for evidence relating to the link between alcohol products deemed to be of higher risk or creating additional harms in the community only comprised one step (searching 11 electronic databases), and did not systematically proceed to determine whether the electronic literature search had identified all relevant articles by hand-searching the reference lists of review articles. This synthesis is also limited to articles published from 2000 to 2011, and so relevant articles published outside of this timeframe would have been excluded. A decision was made to include only articles focused on cancer, cardiovascular and coronary heart disease, cognitive function and dementia, homicide, mortality and suicide. This means that studies investigating other alcohol-related harms and their association with alcohol

products were excluded, but the references have been provided so those interested can look into these harms in more detail.

The findings of the 36 reviewed studies are presented, but are not without methodological limitations. There are variations in study design, target sample and the definition of quantity of alcohol consumed. There is also disparity of findings across the studies.

The key finding from this synthesis is that drinking spirits or beer appears to be associated with a higher risk of harm, while wine consumption might have a protective effect when consumed light to moderately; however, the evidence is mixed and requires further investigation to reach a more definite conclusion.

Examining the evidence related to the minimum price (or floor price) of alcohol products, with a particular focus on recent UK initiatives

A large number of studies have found that price is an effective policy instrument to reduce both alcohol consumption and its associated harms (Wagenaar et al. 2009). The concept of a minimum price for alcohol is to set a floor price, such that the price per standard drink within a particular sale cannot fall below a certain limit. Such a policy is currently being explored as an option to deal with alcohol-related harm in Scotland and in the wider UK (Ludbrook 2009). The policy is likely to have a larger impact within the offsite alcohol sector (bottle shops, supermarkets and alcohol warehouses), where generally alcohol products are relatively cheaper compared to the onsite sector (licensed premised, such as pubs, clubs and restaurants).

The benefits

A minimum price for alcohol is likely to impact, in particular, on cheap, high-strength alcohol products compared to other more expensive, low-strength alcohol products. There will be little impact on the price of low-strength alcohol products (i.e. those associated with less harm), as these generally cost more per standard drink than any likely floor price.

A floor price for alcohol is likely to have a greater impact on the risky consumption of alcohol compared to across-the-board increases in taxes. This is because with an increase in taxes, high-quantity alcohol consumers can normally shift their consumption from more expensive to cheaper alcohol products, rather than reduce their consumption of alcohol (Meier et al. 2009); however, where a minimum price for alcohol exists, there will be no cheaper alcohol products available. In addition, Gruenewald et al. (2006) found in their modelling for Sweden that price increases on the lowest-cost alcohol products would produce a greater reduction in sales than across-the-board increases in price, while for England it was estimated that a 10 per cent across-the-board price increase of alcohol, or a floor price of £0.50 per unit of alcohol, would have the same effect on moderate drinkers, but the minimum price policy would reduce consumption among harmful drinkers by twice as much compared to the general price increase (Purshouse et al. 2010). The projected impact of minimum pricing in the Australian context has not yet been explored.

Given that a minimum price is likely to reduce the cost difference between offsite and onsite sales, it is likely to reduce the extent to which individuals consume large amounts of cheap offsite alcoholic products at home before going out to onsite locations, where they purchase fewer units. A minimum price policy is likely to have a larger impact on the young, including underage drinkers, who generally have less disposable income, are more likely to purchase alcohol for its intoxicating properties, rather than its quality, and are more likely to purchase alcohol from offsite locations, rather than onsite locations (Hunt et al. 2010).

A minimum price for alcohol would restrict supermarkets using alcohol as a ‘loss leader’. This is where supermarket uses the sale of alcohol which is cheaper than the cost price as a marketing tool to get customers to their location such that they are more likely to also spend money on their other products. Though this benefit is only likely to be applicable where alcohol can be sold within or close to supermarkets – thus this is likely to be a greater issue

in those Australian States and Territories where the sale of alcohol can be close to the location of the sale of other products. It will also limit the extent to which alcoholic drinks can be discounted (or bulk discounted) such that the price per standard drink in a particular purchase falls below a certain limit.

In terms of the effect of minimum pricing on-sales it is likely to shift consumption of alcohol to some degree from offsite to onsite but it will also limit the use of “happy hours” for onsite outlets where the sales of alcohol would have otherwise fell below the minimum price to attract customers to a particular location.

The possible limitations

As with taxation, a minimum price for alcohol is likely to not only impact on those consuming at risky levels, but also impact on those consuming within what is considered a low-risk level. Implementing an alcohol floor price is also possibly a regressive policy (it might have a larger impact on the poor), given that the evidence suggests that for those who do purchase alcohol, it is the poor who are more likely to purchase cheaper alcohol. However, generally, the evidence suggests that the poor are also the least likely to purchase any alcohol, and therefore, the regressivity of the policy within the Australian context needs to be explored in more detail. Given that it is often the poor who incur the greatest amount of alcohol-related harm (Herttua et al. 2008), even if the policy is regressive, it might be preferable to implement minimum pricing and compensate those vulnerable groups through the welfare system (Ludbrook 2009).

For those dependent drinkers who currently purchase cheap alcohol products, but find it difficult to cut back, the higher price of alcohol is likely to increase the impact of their drinking on themselves and their families by further reducing their disposable income. If such a policy of minimum pricing is implemented, then it would benefit from a complementary program being implemented, which gives increased assistance to dependent drinkers to help them reduce or stop their drinking.

The higher price for alcohol might increase the extent of home brewing, and might result in some consumers substituting alcohol for other intoxicating products, although the evidence on whether other drugs are a substitute for or complement alcohol is mixed (see Ludbrook (2010) and Moore (2010) for a discussion of the evidence). In addition, the higher price of alcohol might increase the importing of duty-free alcohol or overseas alcohol purchases that are not impacted on by the minimum pricing legislation, although, compared to Scotland, this is likely to be less of a problem for a country such as Australia, where the importing of alcohol from other countries is both more costly and heavily restricted.

The higher prices of alcohol will generally reduce the demand for alcohol; however, given that the demand for alcohol is relatively inelastic, this is likely to increase the revenue from the sales of alcohol (as seen from the scenario-modelling work presented earlier). There is uncertainty about the extent to which those within the alcohol production chain will benefit from this extra revenue (Hunt et al. 2010; Petrie et al. 2011). Those with more monopoly power are likely to be able to obtain a greater share of this increased revenue. This is

compared to taxes, where the benefits of increased prices, and therefore, extra revenue, are obtained by the government.

There is uncertainty about the exact impact that minimum pricing would have on the alcohol supply chain (Hunt et al. 2010). The higher minimum price reduces the incentive for some alcohol firms to lower their production costs, so that they can compete with other producers on price. Also, given that it reduces the potential for some alcohol producers to compete on price, it might increase the extent to which they compete with non-price mechanisms, such as marketing.

Other considerations

A potential consequence of a floor price for alcohol is that it is likely to encourage producers whose products are currently above the minimum price to market lower-strength alcohol products. In particular, minimum pricing is likely to encourage the sale of premixed spirit products, rather than the separate sale of mixers and straight spirits, because the premixed product could be sold for less than the separate products. The exact response to a floor price for alcohol by Australian consumers and those alcohol producers and sellers within the Australian alcohol market is unknown (Hunt et al. 2010), and thus also unknown is the exact impact of minimum pricing on risky consumption and alcohol-related harm within the Australian context. While an extensive amount of research is currently taking place to further explore the impact within the UK context, more research is needed to explore the impact of minimum pricing for alcohol within the Australian context.

Examining the evidence related to hypothecation and the potential to prevent and reduce alcohol-related harm in the community

According to Wikipedia, hypothecation, in the context of taxation, is the dedication of the revenue of a specific tax for a specific expenditure purpose. The Wikipedia website provides two examples of hypothecation, or earmarked taxes, including the fuel tax in the USA, which is dedicated to the funding of transportation infrastructure, and the television licence fee in many European countries, where owners of television sets are obliged to pay the government an annual fee to use their televisions. The proceeds of the fee are then used to fund public broadcasting.

There are many arguments for and against hypothecated taxes. Dedicated taxes are often subject to unexpected shortfalls and surpluses. This might create political pressure to adjust the tax, to budget non-dedicated revenues for the purpose in question or to reallocate surplus funds to other purposes. Governments rarely endorse hypothecation, as it undermines their mandate to allocate budgets as they see appropriate (Doetinchem 2010). However, hypothecated taxes provide taxpayers with inbuilt accountability for public spending. Rather than paying taxes into a perceived black hole, earmarked taxes provide a transparent source to fund specific programs. Hypothecated taxes can educate people about the cost of particular services, such as alcohol or tobacco misuse. Taxpayers can then make better informed decisions about the balance between tax burden and level of services provided. Paying for healthcare costs through hypothecation, for example, could allow governments to explicitly hand back that choice to the electorate and escape potential political fallout (Doetinchem 2010).

A recent report for the World Health Organization, written by Ole Doetinchem, provides a comprehensive overview of hypothecation of tax revenue for health. Hypothecated taxes for health often come in the form of so-called sin taxes. These are levies on the consumption of products that are harmful to health, such as tobacco and alcohol. They raise funds for health spending and discourage health-damaging behaviour. The report documents that the Australian State of Victoria implemented the world's first sin tax that was hypothecated for health in 1987. Tobacco control legislation added a 5 per cent levy on tobacco products, and that revenue was then used to fund VicHealth, an independent health-promotion foundation. Coupled with other legislation at the time that increased the price of cigarette (through taxation) and banned most tobacco advertising, VicHealth was able to use the hypothecated funds to buy out all tobacco industry sponsorships of the arts and sports. The success of the Victorian example resulted in Western Australia and South Australia also hypothecating a proportion of funds accrued from tobacco taxation receipts into foundations established specifically to promote and fund health-promotion activities. Other countries to now fund health promotion from hypothecated taxes include Finland, the Republic of Korea, Portugal and Thailand. Furthermore Belgium, Egypt, the UK, as well as the US States of Alaska, Arizona, California, Maryland, Massachusetts, Michigan, Oregon and Utah, have all instituted some level of hypothecation for health from their tobacco taxes. Egypt, for example, earmarks a part of the revenue from tobacco taxes for subsidizing health insurance for students, covering preventive, curative and rehabilitative health services.

Another report by the World Health Organization (2011) suggests that out of 132 countries included in the Global Status Report on Alcohol and Health, 20 reported using some portion of their alcohol excise tax revenues for alcohol control, health programs or other dedicated purposes. The report outlines an example of the Thai Health Promotion Foundation (ThaiHealth), established in 2001, as is an autonomous state agency. ThaiHealth is funded by taxes collected from producers and importers of alcohol and tobacco. ThaiHealth aims to use its flexibility in management and budget to help initiate, facilitate and transform health-promotion opportunities. Some of the tax revenues are used directly for alcohol consumption control. ThaiHealth supports the establishment of an enforcement surveillance centre for alcohol control regulations, and a research centre on alcohol consumption. ThaiHealth has also paid for advertising campaigns to reduce alcohol-related traffic accidents, to encourage abstinence and to raise awareness of the links between alcohol and domestic violence. ThaiHealth also helped persuade the Thai Government to pass a national policy to control alcohol advertising, and to establish a National Committee for Alcohol Consumption Control.

Data from our analysis indicate that in 2010, the Australian Government collected a total of $5.69 billion from the excise on beer and spirits and the WET. Questions have been raised by the Preventative Health Taskforce relating to the use of government revenue collected from alcohol taxation, including whether all or part of this revenue should be directed to pay for the costs of alcohol problems in the community. In addition to the VicHealth example pertaining to tobacco control, the Northern Territory Government's Living with Alcohol program provides the best Australian example of such an approach to alcohol. In 1992, the Northern Territory Government used a hypothecation approach by placing a levy of 5c per standard drink on the sale of alcohol products with more than 3 per cent alcohol content. The government then used the revenue to fund a range of alcohol-prevention measures in the territory (Gray et al. 2000). These measures included funding for new and existing alcohol education programs and expanded treatment and rehabilitation services. Evaluations of this approach found that combining alcohol taxes with comprehensive programs and services designed to reduce the harm from alcohol were associated with significant declines in alcohol-attributable mortality in the Northern Territory (Chikritzhs et al. 2005; Stockwell et al. 2007). This approach could also include using proceeds from taxation to replace alcohol sponsorship of sporting and cultural events.

A key action item of the Preventative Health Taskforce is that a proportion of revenue from alcohol taxation should be directed towards initiatives that prevent alcohol-related societal harm. The findings from our work suggest that any adjustment to the current rate of excise on alcoholic beverages is cost-effective in terms of reducing the burden of alcohol-related harm and increasing the amount of taxation revenue collected. Research conducted by Doran et al. (2008) and published in Cobiac et al. (2009) emphasises that more than 10 times the amount of health gain could be achieved if a package of interventions, in addition to taxation, was implemented. These interventions might include advertising bans, licensing controls, brief intervention by general practitioners, drink-driving campaigns, random breath testing and residential treatment for alcohol dependence. The cost of this package is estimated at close to $71 million, which is equivalent to a levy of 1.25 per cent of current

alcohol excise taxation receipts. A 5 per cent levy would be equivalent to $285 million per annum, and would fund the implementation of other interventions. Such a levy would cover the cost of the optimal package of interventions and the cost of refunds (approximately $237 million) that the Australian Government currently provides to wine makers under the producer rebate scheme (Australian Government, Australian Taxation Office 2011).

Recommendations

This report supports the recommendation of the National Preventative Health Taskforce and the Henry Review towards taxing alcohol according to alcohol content.

This report recommends a removal of the WET. A removal of the current WET (and applying an excise rate equivalent to low-strength offsite beer for these beverages subject to the WET) will reduce overall alcohol consumption, improve health and increase the amount of alcohol excise taxation revenue by $1.3 billion per year.

Further, this report recommends a two-tiered tax system, with the first tier applying a tax rate on alcoholic beverages (excepts spirits and alcopops) that increases exponentially by 10 per cent for every per cent increase in alcohol content above 3.2 per cent; and the second tier applying the current excise applicable to spirits and alcopops. Such a taxation system would reduce overall alcohol consumption by 3 per cent, avert up to 140,000 DALYs, save the health system close to $2 billion each year and increase the amount of alcohol excise receipts by an additional $2.78 billion each year.

This report recommends that further research is commissioned to comprehensively evaluate the relationship between alcohol-related harm by beverage type. To date, the evidence base is mixed, lacks methodological consistency and requires further investigation to reach a more definite conclusion.

This report recommends that the Australian Government should follow the UK's lead and set a minimum price per standard of alcoholic drink. A floor price for alcohol is likely to have a greater impact on underage and binge drinking, but further research is required to quantify this impact. Further refinements in the taxation system are also required before the Australian Government could consider a minimum price. A more equitable and efficient taxation system, underpinning a minimum price, requires the removal of the WET, adjusting excise rates to reflect alcohol content and a removal of other distortions, such as duty-free and onsite discounts.

This report recommends hypothecation of alcohol excise tax revenues for alcohol control, health programs or other dedicated purposes. The levy should be set at 5 per cent, and indexed annually.

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December 2011