Bingeing, collateral damage and the benefits and costs of taxing alcohol rationally

Research report
October 2012

Report prepared for the Foundation for Alcohol Research and Education

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This report may be quoted as Marsden Jacob Associates (2012) *Bingeing, collateral damage and the benefits and costs of taxing alcohol rationally,* report to the Foundation for Alcohol Research and Education, October.

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Acknowledgements

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Glossary, abbreviations and notes

ABS	Australian Bureau of Statistics
ATO	Australian Taxation Office
AWE	Average weekly earnings
BCA	Benefit cost analysis
Bingeing	Defined as high risk, episodic drinking as defined by National Health and Medical Research Council (NHMRC) Guidelines, i.e., more than four standard drinks a session
Drinker categorisation used in this study	The categorisation of drinkers draws on three sources: • the NHMRC Guidelines to define moderate vs heavy drinking; • the analysis in Sheffield to define hazardous vs harmful drinking within the heavy drinking category; and • the NDSHS data to estimate the number of drinkers and the amount drunk in each category **Non-drinkers**: Defined as not drinking any alcohol during the previous year **Moderate drinkers**: Defined as averaging no more than two standard drinks per day or 14 drinks per week **Hazardous drinkers:** Defined as averaging more than 14 standard drinks per week and • for males less than 40 standard drinks per week • for females less than 28 standard drinks per week **Harmful drinkers:** Defined as average consumption in excess of Hazardous drinkers
GDP	Gross Domestic Product
Henry Tax Review	(Review of)Australia's Future Tax System
HTO	Harms to others
LAL	Litres of pure alcohol
MJA	Marsden Jacob Associates
NDSHS	National Drug Strategy Household Survey 2010
NHMRC	National Health and Medical Research Council
NHMRC Guidelines (or the Guidelines)	NHMRC's 2009 publication *Australian Guidelines to Reduce Health Risks from Drinking Alcohol*
OHS	Occupational Health and Safety
Off-trade	Alcohol served in containers for consumption away from the premises.
On-trade	Alcohol served to consumers directly by hotels, clubs, etc. Consumption will occur in defined licensed areas associated with the provider.
p.a.	Per annum
RTD	Ready to drink
Standard drink	A drink containing 10g of alcohol. Note in the UK, a standard drink contains 10ml of alcohol.
WET	Wine Equalisation Tax

Notes

(a) Figures in tables and generally in the text have been rounded.

(b) The following notations are used:

$m $ million

$b $ billion

In general, we have rounded all estimates to the nearest $10 million.

Financial years are denoted by a slash: 2010/11 is the financial year ending June 2011.

(c) References to 'the States' or 'each State' include the Australian Capital Territory and the Northern Territory. Standard abbreviations apply.

Executive summary

Context

1. Marsden Jacob Associates (MJA) was commissioned by the Foundation for Alcohol Research and Education (FARE) to prepare a benefit cost analysis (BCA) of alcohol taxation reform. The BCA undertaken and reported here, *inter alia*, extends the preliminary analysis presented by the review of Australia's Future Tax System (the Henry Tax Review) and examines the impacts of relevant reform scenarios on alcohol related harms, consumer satisfaction and welfare, and government tax and revenues.

2. Factors driving this first Australian analysis of the benefits and costs of alcohol taxation and pricing reforms include:

   - the accumulating evidence on the role of alcohol consumption and associated behaviours in harms to individual drinkers and others in the community;

   - community concerns over the costs imposed by drinkers on others;

   - wider recognition that the current structure of alcohol taxation in Australia is anomalous; and

   - the international evidence that alcohol taxation and pricing is an effective and pervasive instrument in reducing alcohol consumption and alcohol induced harms.

3. The National Drug Strategy Household Survey (NDSHS) (2010) shows that:

   - almost three-quarters of self-reported alcohol consumption in Australia is at levels in excess of National Health and Medical Research Council (NHMRC) Guidelines, either short-term or long-term. Self-reported consumption levels vastly understate actual official data on 'apparent consumption levels'. Consequently, the proportion in excess may be higher;

   - towards 60 per cent of reported alcohol consumption is at short-term (i.e., episodic drinking) at high-risk levels, (i.e., bingeing); and

   - just over 4 per cent of Australia's adult population accounts for almost one-third of self-reported consumption. Conversely, non-drinkers and moderate drinkers – representing almost 85 per cent of the adult population – consume little more than one-third of total self-reported consumption.

4. Currently, in Australia wine is taxed on its wholesale value through the Wine Equalisation Tax (WET) while other alcoholic beverages incur an excise based on alcohol content. The excise level varies across beverage type, proportion of alcohol content and, in the case of beer, by size of packaging (effectively differentiating on-trade and off-trade).

5. Alcohol taxation reform would improve the efficiency of the Australian taxation system and improve resource allocation efficiency by removing current distortions in favour of cheap wine. As recommended by the Henry Tax Review, this involves shifting all alcohol taxation to a volumetric basis. Importantly, an increase in alcohol taxation would reduce consumption and the associated adverse externalities.

ES Chart 1: Economic perspective on the benefits and costs of alcohol consumption

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                        ┌─────────────────┐
                        │   Change in     │
                        │  alcohol taxes  │
                        └─────────────────┘
         ↙                       │                       ↘
┌──────────────┐                 ▼                 ┌──────────────┐
│  Increased   │        ┌─────────────────┐        │  Improved    │
│excise revenue│        │   Change in     │        │  resource    │
│ – ability to │ ◄───── │    alcohol      │ ─────► │allocation but│
│   reduce     │        │  consumption    │        │ short -term  │
│  inefficient │        │   volumes and   │        │ disruption to│
│    taxes     │        │    patterns     │        │  suppliers   │
└──────────────┘        └─────────────────┘        └──────────────┘
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                Benefits                                    Costs

┌──────────────┐  ┌──────────────┐        ┌──────────────┐  ┌──────────────┐
│ Reduction in │  │ Reduction in │        │ Reduction in │  │ Reduction in │
│ costs internal│ │  costs to    │        │  benefits    │  │  benefits to │
│  to drinker  │  │  rest of     │        │ internal to  │  │ rest of      │
│    alone     │  │  society     │        │drinker alone │  │  society     │
└──────────────┘  └──────────────┘        └──────────────┘  └──────────────┘
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Benefits — Reduction in costs internal to drinker alone:
- Health care costs paid by drinkers
- Unemployment/ low productivity/ low earnings
- Reduced incarceration
- Reduced damage to own property

Benefits — Reduction in costs to rest of society:
- Direct HTO
- Health costs paid by others
- Other indirect HTO
- Labour supply, workplace productivity

Costs — Reduction in benefits internal to drinker alone:
- Loss of consumer satisfaction
- less 'irrational consumption'*

Costs — Reduction in benefits to rest of society:
- Socialisation benefits

Notes: Bold items are explicitly included in the quantitative analysis.

* Examined in sensitivity analysis

Assessment Framework

6. Ideally, a full and comprehensive assessment of alcohol taxation reform needs to be multi-faceted and examine the benefits, costs and their distribution of each major component including:

- the reduction in direct externalities, (i.e., direct harms to others);

- the reduction in indirect externalities including the cost of health harms to drinkers subsidised/paid for by others via Australia's tax, welfare and health systems;

- the correction of private consumption decisions which are ill informed, irrational or not based on the full incremental costs of the drinking decision;

- changes in tax efficiency; and

- changes in the efficiency of resource allocation, recognising the short-term disruption to business and suppliers.

Focus on Harms to Others

7. For this study, we have focussed the quantitative analysis on one component only, i.e., on estimating the net benefits from reducing the costs of harms to others (HTO). A key reason for this focus is that these costs are unequivocally externalities to the individual's decision to drink.

8. The economic framework provided by the BCA is rigorous and comprehensive and is required by governments in Australia for major policy and regulatory reform initiatives. Despite this, a BCA has not previously been publicly applied in Australia to evaluate options for alcohol taxation and policy.

9. Alcohol brings substantial pleasure to consumers. Any reduction in this satisfaction is a cost. However, alcohol also brings major costs to drinkers, others in proximity and to broader society. The full range of costs to society as a whole includes health harms from over 50 cancers, absenteeism, workplace accidents and productivity loss across the economy, motor vehicle accidents and a wide range of harms to others.

10. Any reduction in costs incurred by persons other than the drinker – or by drinkers where their decisions are not wholly rational, fully informed or do not reflect full incremental costs – is a benefit in terms of economic efficiency. Consequently, we have also estimated the reductions in costs to drinkers for irrational and uninformed drinking.

11. The costs of HTO are those costs from the collateral damage imposed by drinkers (mainly through short-term excessive drinking). These HTO include:

- part of the costs of running Australia's criminal justice, child protection and insurance systems;

- violence, earlier death and increased morbidity;

- property damage and theft; and

- loss of quality of life, time and cost associated with looking after drinkers.

The magnitude of these externalities had not been quantified for Australia until recently. The truncated set of HTO examined in this BCA has a cost base of more than $15 billion a year, although a wider scope of HTO and significantly higher estimates could be justified.

12. HTO costs could be reduced at least in line with the reduction in the short-term episodic volumes brought about by increasing the prices of alcohol. Such price increases could be achieved in Australia by reforming the existing alcohol taxation regime, specifically by removing the Wine Equalisation Tax (WET) and taxing all alcohol on a volumetric basis and increasing the volumetric excise rates.

13. To explore the benefits and costs of the WET and alcohol taxation reform, MJA developed a benefit cost simulation model. For this study, the model:

- examines all costs resulting from the tax/excise changes including the reduction in consumer satisfaction and the implementation costs of extending the excise system to wine and increasing rates of excise on other alcohol products;

- examines one source of benefits only, i.e., the reduction in the short-term costs of harms to others that results from reducing short-term episodic consumption;

- excludes reductions in the costs of harms to drinkers even though these are mainly paid for by others. The study excludes from consideration reductions in the costs of health harms for the drinker and reductions in the costs of alcohol related absenteeism, occupational health and safety (OHS) incidents, and stoppages and productivity losses for the drinker;

- uses conservative parameter values or approaches wherever authoritative estimates are lacking. For example, the study values carers' time at 10 per cent of average weekly earnings (AWE) rather than the full cost of time taken away from work; and

- adopts value judgements aligned with the considered and consistently revealed social preferences of the Australian community.

Benefit Cost Analysis – results

14. Overarching results from the MJA alcohol BCA model are that:

- broadening and increasing Australia's volumetric excises on alcohol would increase the price of alcohol, reduce binge drinking and reduce the cost of HTO and yield major benefits for Australia at relatively small costs, i.e., there would be significant net benefit for the Australian community as a whole;

- Moderate drinkers (almost two-thirds of the adult population) are clearly beneficiaries of the modelled alcohol taxation reforms. Their loss of satisfaction which results from higher prices and reduced consumption of alcohol, is more than offset by:

    – significant cost savings from reduced level of harms caused by the binge drinking of others. Moderate drinkers account for the largest portion of the benefits of reduced harms to others; and

    – increased disposable income. Moderate drinkers are major beneficiaries from any reasonable method of rebating the increased alcohol excise revenue back to taxpayers or the community.

These two sources of benefit swamp the estimated costs (i.e., the costs of implementation and the loss of enjoyment from reduced consumption of alcohol); and

▪ Non-drinkers are also unequivocally beneficiaries from reduced HTO and rebates for taxpayers.

15. The MJA alcohol model examined several policy experiments, including:

▪ Policy Experiment 1: the WET is removed and replaced with a volumetric excise set at $29.05 per litre of alcohol. All other excise rates are unchanged; and

▪ Policy Experiment 2: the WET is removed and replaced with a volumetric excise set at $29.05 per litre of alcohol. Excise rates on alcoholic beverages other than wine are increased by 50 per cent.

16. The results of the analysis of these options are resoundingly positive:

▪ Experiment 1 results in a net public benefit of $230 million per annum, comprising $330 million per annum in reduced HTO and net loss of consumer surplus (or consumer enjoyment) of $100 million per annum; and

▪ Experiment 2 results in a net public benefit of $250 million per annum, comprising $820 million per annum in reduced HTO and net loss of consumer surplus (or consumer enjoyment) of $570 million per annum.

17. More broadly the results of all simulations and sensitivity analyses more than break even, despite the omission of major sources of direct and indirect externalities from our analysis.

18. The strength of the case for reform of Australia's alcohol taxation would, *prima facie,* be further reinforced if increases in the efficiency of the tax system as a whole and in resource allocation were also recognised and brought to account.

Policy Implications

19. Alcohol taxation reform offers major benefits in terms of reducing the harms from alcohol and major additional efficiency benefits to the Australian economy. These benefits individually and collectively overwhelmingly offset the costs of implementation and loss of satisfaction. Pertinent insights include that:

▪ our simulation analysis only evaluates three of some ten potential sources of benefit. The omitted sources provide confidence in the robustness of the conclusions from the quantitative results;

▪ there are very large benefits available to the majority of the Australian population from alcohol taxation reform. Alternatively expressed, the current system and level of alcohol taxation imposes multi-billion dollar costs on Non-drinkers and Moderate drinkers (almost 85 per cent of adult population); and

- the benefits of reducing the costs associated with alcohol are only one part of the story. Alcohol taxation reform offers major gains in (a) tax efficiency since increased excise revenue can be used to reduce less efficient taxes and (b) the efficiency of resource allocation in Australia.

20. This application of BCA to alcohol tax reform provides a robust, new, detailed and separate case for alcohol tax reform in Australia:

- it is a robust case because, despite examining only one subset of benefits (HTO), the magnitude of the limited scope of benefits enumerated comfortably exceeds the fully enumerated cost of alcohol tax reform;

- it is a new and detailed case because HTO have not previously been the focus of a detailed public policy simulation study; and

- it is separate and independent because the net benefits gained from reducing HTO are sufficient in themselves to justify alcohol tax reform. An economic case for alcohol tax reform can be made on the basis of reduced HTO alone without reliance on the several other sources of benefit which would be potentially activated.

  As noted, these include reductions in health harms to drinkers but paid for by others; reductions in the cost of alcohol in the workplace to business and the economy; and reductions in the deadweight costs of Australia's inefficient taxes.

  Although excluded from the current study, these sources of potential benefit would be incrementally positive. Each would provide separate additional benefits and possibly separate standalone cases for alcohol tax reform.

21. The vast majority of taxpayers would benefit by the savings generated by the reduction in harms to drinkers funded / subsidised by Non-drinkers and Moderate drinkers.

22. The collective set of findings from this study has relevance beyond Australia. Although calibrated to Australia, our analytical framework, modelling and simulations on bingeing and HTO suggest that the similar qualitative findings will apply in the United Kingdom and other economies with similar drinking patterns and strong bingeing cultures among drinkers.

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Postscript: minimum price regulation

23. For excise tax reform, this first application of a fully specified economic framework consistent with the needs of public policy formation and economic evaluation strengthens the separate arguments for alcohol taxation reform based on public health alone.

24. Excise tax reform is not the only method of increasing alcohol prices to reduce HTO. However, the option of minimum price regulation (as implemented in Scotland and is currently being contemplated in England and now the subject of an Australian National Preventive Health Agency (ANPHA)Issues Paper) performs badly when the distribution of benefits and costs across the adult population is assessed in a benefit cost framework. This is so because in contrast to excise tax options, minimum price regulation creates and legitimises super profits/ monopoly rents for alcohol suppliers. These super profits/monopoly rents are of the same magnitude as the increase in tax revenue that would occur under the option of a (discriminatory) increase in excise rates. Consequently:

    - whereas raising beverage prices by increasing tax rates and tax revenue provides a mechanism to offset (for all taxpayers) the loss of consumer surplus from reduced consumption, this cannot occur for most consumers when prices are raised by minimum price regulation;

    - compared with the option of increasing tax rates on alcohol, the option of raising minimum prices is highly regressive. The super profits created by minimum price regulation will flow overwhelmingly to parties in the alcohol supply chain already holding monopoly power, i.e., the major retailers, and thus to their Australian and foreign shareholders. Although many Australians hold shares through their superannuation funds, both superannuation fund balances and direct shareholdings are held disproportionately by individuals at the very top of the income distribution; and

    - for the vast majority of the Australian adult population, minimum price regulation will achieve a net benefit only if the benefits from reduced harms exceed the gross (as distinct from the net) loss of consumer satisfaction / surplus (since for them there is no offsetting tax effect). For the vast majority of the population, for the benefits of price regulation to exceed the costs requires that the benefits of (minimum) price regulation be a significant multiple of the benefits of increased taxation.

    This raises the question why bother with minimum price regulation when the same or greater benefits can be achieved more simply through the tax option by abolishing the WET and increasing alcohol excise rates generally?

25. The rationale for comprehensive minimum price regulation cannot depend on the argument that it would avoid penalising Moderate drinkers since this study has shown that Moderate drinkers are unequivocal beneficiaries when excise tax rates are increased. This is not to say that other arguments may not be made to introduce minimum pricing.

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1. Introduction

1.1 Background

There is accumulating evidence on the role of alcohol consumption and associated behaviours in harms to individual drinkers and others in the community.[1,2] At the same time, the anomalous structure of alcohol taxation in Australia has become better recognised as has the international evidence that alcohol taxation and pricing is an effective and pervasive instrument in reducing alcohol consumption and alcohol-related harms.[3,4]

The economic framework provided by benefit cost analysis (BCA) is rigorous and comprehensive and is required by governments in Australia for major policy and regulatory reform initiatives.[5] A BCA has not previously been publicly applied in Australia to evaluate options for alcohol taxation and policy.[6]

Marsden Jacob Associates (MJA) was commissioned by Foundation for Alcohol Research and Education (FARE) to prepare a BCA of alcohol taxation reform. The BCA undertaken and reported here, *inter alia*, extends the preliminary analysis presented by the Henry Tax Review and examines the impacts of relevant tax reform scenarios on alcohol-related harms, consumer satisfaction and welfare and government tax and revenues.

Ideally, a full and comprehensive assessment of alcohol taxation reform would examine the benefits, costs and their distribution for each component. These include:

- the reduction in direct externalities, (i.e., direct harms to others);

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[1] See Babor *et al* (2003) for the seminal international work in this area. More recently Laslett *et al* (2010) has examined the costs of harms to others for Australia.

[2] Over the past 50 years or more there has been a pervasive trend in Australia to liberalise regulation of opening hours, numbers and density of licensed premises, retail outlets selling packaged liquor and other dimensions of accessibility. Community concerns over the costs imposed by drinkers on others have increased.

[3] More recently the review of *Australia's Future Tax System* (Henry Tax Review) examined a wide range of tax issues including alcohol excises and the WET. The review was directed to

"*...examine and make recommendations to create a tax structure that will position Australia to deal with the demographic, social, economic and environmental challenges of the 21st century and enhance Australia's economic and social outcomes.*"

[4] Babor *et al* (2003).

[5] The weighing of the benefits and costs of government interventions is a widespread requirement across Australian governments. For example, changes in regulation of industry are conducted in Australia within the framework of regulatory impact statements (RIS). Thus "*when a regulatory proposal is likely to have an impact on business or the not-for-profit sector*", the proponent must undertake a RIS that provides the preferred option and demonstrates the costs and benefits of that option. Such a review would be required for any changes to alcohol taxation, pricing or regulation.

[6] For an early United States (US) benefit cost analysis of alcohol taxation, see Pogue, T. and Sgontz, L. (1989). For a recent benefit cost analysis in the context of New Zealand, see Marsden Jacob Associates (2009).

- the reduction in indirect externalities including the cost of health harms to drinkers subsidised/paid for by others via Australia's tax, welfare and health systems;

- the correction of private consumption decisions which are ill informed, irrational or not based on the full incremental costs of the drinking decision;

- changes in tax efficiency; and

- changes in the efficiency of resource allocation, recognising the short-term disruption to business and suppliers.

For this study, we have focussed the quantitative analysis on one component only i.e., on estimating the net benefits from reducing the costs of harms to others. A key reason for this focus is that these costs are unequivocally externalities to the individual's decision to drink.

In examining the benefits and costs of changes in alcohol excise, this study seeks to:

- define the characteristics of the Australian alcohol market consistent with the economic characteristics of alcohol as *"no ordinary good"*;[7]

- clarify and make explicit all value judgements affecting the analysis of benefits and costs;

- establish a modelling simulation framework;

- present first estimates of the changes in benefits and costs resulting from relevant policy experiments which build on replacing Australia's Wine Equalisation Tax (WET) with a volumetric tax and increasing rates of existing alcohol excises. We expect these first estimates to provide a foundation for more refined analysis. Where necessary, future analyses can take advantage of tailored or bespoke inputs to generate more precise evaluations of the benefits and costs. Our intent and expectation is that refinements to the framework and to our estimates will always strengthen rather than weaken our findings of net benefits; and

- adopt a conservative stance. The scope of benefits evaluated is deliberately very narrow and restricted to reductions in the cost of collateral harms caused by drinkers to others.

Throughout our analysis and investigation we have sought to adopt and implement a deliberately transparent and conservative stance. Specifically:

- we have sought to include all costs (efficiency losses, implementation costs and reduced consumer satisfaction) but have included only part of the potential benefits (solely from reduced costs to others) resulting from the reduced consumption which would result from an increase in alcohol excise taxes,

- wherever there is no clear or authoritative estimate, we have adopted conservative estimates so that the results are deliberately biased against the case for alcohol reform. For example, we have valued people's time at 10 per cent

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[7]   *"Alcohol is not just another product. Consumption of alcohol can be harmful to consumers, and can have significant effects on people other than the consumer, such that regulatory intervention is necessary."* Foreword by National Competition Council to "Identifying a framework for regulation in packaged liquor retailing". NCC discussion paper prepared by Marsden Jacob Associates (2005).

of average weekly earnings (AWE); other studies have used the full value of AWE. A second example is that our base case assumes that all consumption provides value for the drinker. However, decisions on high risk drinking especially are unlikely to be fully rational, fully informed or reflect the full incremental costs of the decision.

All BCA's involve value judgements. We have sought to align judgements adopted in the study with our understanding of the consistently revealed social welfare preferences of Australians. (See section 3.2 for a discussion of the relevance of societal norms for a BCA.)

This paper reports the framework, range of judgements, assumptions and data considered in this first attempt for Australia to '*do the hard yards*' necessary for a robust analysis of benefits and costs of alcohol taxation reform.

1.2   Outline of report

Chapter 2 provides an outline of the Australian alcohol market and its drinkers, and the external effects from drinking.

Chapter 3 outlines the requirements for, and distinguishing features of, the benefit cost simulation model developed for this study; the distinction between value judgements sometimes made by economists and the consistently revealed social preferences of the Australian community. Chapter 3 concludes by describing MJA's policy simulation model of the alcohol market.

Chapter 4 describes the requirements, options available and choices made for the data and key parameters necessary to populate the model.

Chapter 5 reports the results of the policy simulations in terms of aggregate community benefits and costs and the position of Moderate drinkers and other drinkers.

Finally, Chapter 6 outlines the conclusions from the analysis and discusses their implications and future directions.

Appendix A extends Chapter 3 by outlining the conceptual framework and principles of BCA, their use for regulatory impact analysis and particular issues for review of changes in the alcohol market. Reviews of studies on the costs of alcohol informing the model are provided in Appendix B. Appendix C provides details of the HTO costs included in the model. Appendix D examines the importance of value judgements and differences in their use within the economics profession. Appendix E examines productivity costs, particularly those associated with absenteeism. The incidence of harms across different drinker populations is discussed in Appendix F. Following on from the conclusions from the main body of the report, Appendix G outlines some future directions for research. Finally, Appendix H provides an extensive description of sensitivity analysis undertaken for the main parameters in the model.

2. Alcohol and external effects of its consumption

This chapter examines the demand, supply and public policy issues for alcohol in Australia and the key facts relating to harm to others (HTO) and to binge drinking.

2.1 Characterisation of the alcohol market

Public policy evaluation requires a rigorous and logical framework which is able to capture the character and essence of the issues. The principles of BCA provide such a framework. Our characterisation of the key issues/elements of the alcohol market is set out below:

1. **Consumers enjoy alcohol** and gain satisfaction from its consumption.

2. **Alcohol is no ordinary commodity**. In addition to the immediate benefits of enjoyment, relaxation and socialisation, alcohol is associated with:

   - acute harms to both the drinker and to others. Acute harms include violence, physical harms, theft, property damage, noise and nuisance, motor vehicle accidents, absenteeism and productivity loss. Acute harms are mainly due to high risk, episodic drinking and associated behaviours; and

   - chronic harms, particularly to health. Chronic harms are mainly associated with the drinker's long-term consumption.

3. **Individuals make consumption decisions**, but these choices (and how they behave/comport themselves when drunk) are strongly influenced by general community norms, specific cultural and peer group pressures and commercial marketing.[8]

4. **Consumers may not always be rational or informed**. Indeed, alcohol consumption is a learned and habit forming behaviour.[9] Such habit-forming consumption affects rational choice. Risk-taking is increased and self control

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[8] The classic reference on the role of societies in conditioning the decisions of individuals on their behaviour when drinking is McAndrew and Edgerton (1969). This anthropological survey indicates that alcohol abuse is a learned behaviour. It also shows that cohesive societies can, and do, change the norms establishing the accepted level(s) of tolerance for alcohol consumption and related behaviours. (While economists focus on the benefits and costs to individuals and the aggregation thereof, the anthropological studies point to community level decisions making based on consideration of all costs.)

Concern over the collateral harms caused by drinkers to others may also affect the decreased willingness of the community to accept bad behaviour when drunk. The normative cultural position in Canada

"... [is] that drunkenness should never excuse violence, particularly sexual violence."

"popular sentiment [in North America] is that intoxication is no excuse for bad behaviour." [Room (2001), p. 197]

[9] Alcohol interferes with the brain remoulding and development that occurs in late teens, and thus may affect both perceptions and behaviour. Age at first drink is a strong predictor of drinking levels in later life. This is a characteristic of addiction.

reduced when intoxicated – with the result that the invitation to "*have (another) drink*" is more readily accepted after a drink or two than intended when sober or after the event. Indeed, time inconsistent preferences are a widespread feature of alcohol consumption.[10]

Consumers – and others including medical professionals – find it difficult to remain informed about the effects of alcohol consumption. For instance, there is a rapidly changing and complex understanding of the relationship between consumption and health (see Box 1).

Box 1: The challenge for fully informed decisions from rapid change in evidence on health benefits and harms from drinking

There is evidence to suggest that the general public is not fully informed of the extent of the range (or the strength of *dose response* relationships) of diseases to which alcohol is causally related. For instance:

- a study of 1,523 Australians found that while the vast majority (between 60 per cent and 90 per cent) thought that alcohol can cause brain damage, liver cirrhosis, mental illness, heart disease and pancreatitis, only half thought that alcohol can cause cancer;[2] and

- a poll of 1,009 Australians conducted by Galaxy Research in 2011 found that only 24 per cent of people surveyed knew that alcohol is linked to mouth and throat cancer, and only 11 per cent knew that alcohol is linked to breast cancer.[3]

- data from the 2010 National Drug Strategy Household Survey (NDSHS) suggest that many women are unaware of the latest NHMRC Guideline to avoid alcohol consumption during pregnancy. The survey found that 51.1 per cent of Australian women continued to consume alcohol while pregnant, with 2.6 per cent of these women reporting that they consumed either the same or more alcohol than they did before they were pregnant.[4]

Factors contributing to individuals having less than full information on the harms from alcohol consumption and possible benefits of reductions in consumption include that:

- the evidence on the links between consumption and health harms has changed over time, and continues to change with new research. This is particularly the case with the causal relationships between alcohol and cancer and alcohol and cardiovascular disease. There have also been on-going changes in the recommendations made regarding safe levels of alcohol consumption during pregnancy; and

- health professionals provide advice that is inconsistent with the NHMRC Guidelines. For instance, a study of 659 health professionals who had cared for pregnant women found that only 13 per cent provided advice consistent with the NHMRC Guidelines on alcohol consumption in pregnancy.[5]

Notes:

1. *Rehm et al (2003).*

2. *Thomsen et al (2011).*

3. *FARE (2011).*

4. *Australian Institute of Health and Welfare (AIHW) (2011).*

5. *Payne J, Elliott E, D'Antoine H, O'Leary C, Mahony A, Haan E, et al. (2005).*

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[10] Heavier drinking can be interpreted as (assuming full information) a higher discount on long-term benefits vis-a-vis the immediate satisfaction of short-term cravings.

5. **Consumption patterns, behaviours and responses to prices and regulation are heterogeneous**.[11,12] For instance, it is necessary to look at behavioural responses, benefits and costs for different persons when estimating the costs and benefits of alternative policies. Thus, at risk drinkers, such as heavy and under-age and young drinkers, appear to preferentially seek lowest cost alcohol in terms of dollars per litre of pure alcohol (LAL) and are therefore more heavily affected by both increases in excise taxes and/or minimum price regulation.[13, 14]

6. **There is no strong evidence of a consistent pattern or stable relationship between the type of beverage and harms.** What evidence there is not stable. However there is some evidence of harm associated with varying alcohol content. Were there to be compelling evidence it would potentially make a case for **non-uniform** volumetric excise taxes across beverage types.[15] The use of such non-uniform volumetric taxes would rely heavily on confirming the cross-price elasticities of beverage demands expected, especially for Hazardous and Harmful drinkers.

7. **Collateral harms to others result primarily from episodic drinking behaviour leading to intoxication**. The collateral damage caused by drinkers to others is the prime focus of the general public's concern over drinking (see Box 2).

8. Recent surveys and estimates of the costs of HTO indicate that **HTO are multiple and substantial**.[16] To date the public policy debate and numerical analyses have been dominated by a focus on health/disease harms to the drinker.[17] The debate and analysis needs to, and can be, broadened and rebalanced to include HTO, tax system efficiency and the efficiency of resource allocation (This study takes the small step of focussing on HTO.).

9. **The incidence of benefits and costs matters.** Governments need to understand both the aggregate benefits and costs and their incidence in terms of winners and losers. The benefits of reducing the costs of harms (and changes in consumer welfare) can – and should – be identified across the major categories of drinkers and adult population.

Policy advice/decisions require estimates of changes in benefits and costs resulting from a change in the relevant policy instruments. (The absolute size of benefits and costs is not relevant for policy unless something can be done to change them.) This requires *inter alia*:

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[11] For Australia, see AIHW (2011) and Stockwell et al (2002).

[12] For a provocative analysis of heterogeneity in price responsiveness see Ayyagari et al (2009). A summary of the extensive investigations and modelling for the UK, see results of the Sheffield research as described by Purshouse et al (2010) and Meir et al (2010).

[13] Such as is being discussed in the UK.

[14] For the United Kingdom see Purshouse et al (2010).

[15] See Pigou (1932) and, more recently, Fogarty (2011).

[16] Compare and integrate estimates from Collins & Lapsley (2008) and Laslett *et al*. (2010).

[17] For Australia see Byrnes et al (2010) and Doran (2011).

- demand and tax functions showing how the levels of consumer benefits and tax/excise revenues change as tax /excise rates (or regulations) change; and

- incremental '*dose/response*' functions showing how the level of costs for each harm responds to changes in levels of consumption and in the environment for behaviour.

Box 2: Public concerns – collateral damage vs harms of abusive drinking to drinkers themselves

There are differing levels of public concern about the third party or collateral damage caused by alcohol use (especially, violence and publicly visible harms) compared with the harms that drinkers inflict on themselves (but not on others). This is inferred from a number of factors.

Around three quarters of the Australian population are exposed to the third party harms of alcohol in Australia each year. In contrast, about 4.3 per cent of the population suffer from alcohol use disorder themselves (according to the latest national mental health survey). Given this, it is clear that people are far more likely to be affected by the third party harms of alcohol than they are to themselves have an alcohol use disorder or to be close to someone who has one. On the basis of these different levels of exposure, it follows that we would expect people to be more concerned about something that they are more likely to be exposed to or to experience themselves.

Similarly, FARE's Annual Alcohol Poll results for 2011 show that about 80 per cent of the 1,009 people surveyed think that Australians have a problem with excessive drinking (presumably from exposure to adverse effects of others drinking), but only 7 per cent are uncomfortable with their own drinking. Again, the discrepancy in these numbers would suggest that people are more concerned about other people's drinking (and its collateral effects), than they are about their own drinking and its potential consequences.

2.2   Focus on harms to others and bingeing

HTO from alcohol associated behaviours, are – by definition – externalities and the recent cost estimates[18] provide a base for policy analysis.

Focussing on the costs of HTO – as reported by surveys and directly collected data on the loss of time and other costs imposed on others by drinkers – has several advantages:

- it rebalances the debate by drawing analytical attention to the substantial costs of alcohol consumption and behaviour which lie in areas other than impacts on drinkers themselves. While the general public has voiced rising concern over the harms from others drinking, the cost estimates of HTO have only recently become available for Australia. Despite restricting our focus to HTO and choosing more conservative estimates of the cost of some of these harms, the base level of HTO for Australia in 2010/11 totals in excess of $15 billion (see Table 6); and

- HTO are externalities by definition. Consequently, the issues of conflicting value judgements on what constitutes an externality can be reduced.

Our observation and premise is that HTO are mainly, perhaps overwhelmingly, harms caused by excessive consumption in short-term episodic drinking. In popular terms, HTO primarily stem from excessive episodic consumption behaviour which may occur daily (as exemplified in someone with a dependence on or addiction to alcohol), or

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[18]   Laslett *et al* (2010).

infrequently such as once a month (as exemplified in the "*binge drinking young person*"). Thus, drinking patterns across different consumers need to be analysed and understood.

Our analysis of the unit record data from the NDSHS for 2010 (see section 3.3 below) indicates:

- almost 75 per cent of self-reported alcohol drunk in Australia is consumed at levels in excess of the NHMRC Guidelines; [19]

- towards 60 per cent of all self-reported alcohol drunk is consumed in single events at rates above the short-term drinking the NHMRC Guideline, i.e., more than four drinks per day;

- over 40 per cent of all self-reported drinking is short term (i.e., in single episodes) at rates 50 per cent above the NHMRC Guideline maximum; and

- only 15 per cent of all adults drink at levels in excess of the NHMRC Guidelines for long-term harm (more than two standard drinks daily).

Self-reported alcohol consumption account for only 57 per cent of actual 'apparent consumption of alcohol.'[20] On the question of sources of potential bias, the World Cancer Fund Report (2007) notes that survey under-reporting of consumption levels is likely to be greatest where there are elements of embarrassment or illegality in consumption and that as a result, is likely to be greatest for heavy drinkers and for the young. Consequently, the above estimates likely understate the extent of binge drinking in Australia.

Our analysis suggests that drinking patterns in Australia are dominated by bingeing, i.e., short-term episodic drinking at risky levels.[21] As a result, Australians are incurring from their alcohol consumption, far higher levels of risk to health and broader wellbeing consumption than they are willing to accept in virtually any other area of public policy,

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[19] These estimates of drinking patterns of Australians should not be surprising. First, the estimates barely change when we apply UK medical guidelines. Second, they are consistent with the Stockwell *et al* (2002) estimates which were based on the less stringent NHMRC 2001 Guidelines. Based on estimates in Stockwell *et al*. (2002), it is likely that in excess of 67 per cent of alcohol is consumed at levels of risk greater than 1/100. This estimate (67 per cent) should be seen as extremely conservative because:
   a) the 67 per cent is based on earlier Australian (NHMRC) Guidelines, which are more lenient than the NHMRC's 2009 Guidelines; and
   b) the 67 per cent is based on drinking levels reported in survey responses which typically under report volumes actually consumed by around 50 per cent.
      See Stockwell, T. et al. (2002), pp. 91-92.
   The quantitative impact of the understatement of the level of harmful drinking can be illustrated by a simple calculation. Assume all of the understatement between survey reported consumption and the sales data are 50 per cent, and assume further that all this under reporting is due to heavy or excessive drinkers. Thus rather than 67/100, the percentage of harmful drinking becomes 167/200 i.e., 83 per cent.

[20] This is the Australian Bureau of Statistics (ABS) measure of alcohol consumption. It is apparent as it relates to information derived from tax collections rather than physical consumption.

[21] The NHMRC Guidelines state that "*For healthy men and women, drinking no more than four standard drinks on a single occasion reduces the risk of alcohol-related injury arising from that occasion*". While the NHMRC Guidelines for long-term drinking reduces the risk of harm from alcohol to below 1-in-100, there is a slightly different metric for reducing harms from drinking on an occasion. It notes:
   - *the lifetime risk of death from injury remains below 1 in 100 for both men and women if they always drink two drinks or less on an occasion, even if the occasions are every day; and*
   - *the lifetime risk of hospitalisation from injury is about 1 in 10 for men and 1 in 12 for women with a drinking pattern of four drinks on an occasion about once a week.* NHMRC Guidelines (2009) p. *56.*

especially OHS, other areas of public liability and specific areas such as dam safety and airline travel.[22, 23]

In summary, bingeing is a major issue for Australia, and therefore an important focus for public policy analysis.

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[22] Road safety has a higher risk than alcohol but in contrast to alcohol, communities and their governments have systematically pursued safety measures, regulations and penalties. Some countries, such as Sweden, have begun to move towards zero tolerance of road deaths by re-engineering major roads and traffic systems.

[23] For an early and broad discussion based essentially in the US, see Slovic, P., (1987). For a more recent discussion see Marsden, J., *et al* (2007).

3. Description of MJA alcohol model

3.1 Requirements for and distinguishing features of MJA alcohol benefit cost model

Public policy requires, at a minimum, that for any change to be efficient the benefits to the community must exceed the costs. The benefits and costs of major policy changes, therefore, need to be systematically evaluated. Alcohol policy options in Australia have not to date been subject to benefit cost evaluation – at least not in published form.

Governments also justifiably wish to understand who wins and who loses from various policy changes. Opposition to evidence-based interventions to reduce alcohol-related harms includes the concern not to ... "*punish the majority of people who drink responsibly*" and not to "*penalise moderate drinkers*". The concern over potentially damaging impacts on responsible moderate drinkers is a feature in the policy debate in Australia and in the United Kingdom. It is necessary to evaluate this concern directly.

Our framework and quantitative analysis seeks to address these requirements and has the following distinguishing features:

- we estimate the loss of consumer benefits and examine the case for alcohol taxation reform in terms of the dominant language of governments in Australia, i.e., in terms of the potential improvement in economic benefits and costs of alcohol for the community as a whole.[24]

   This is more than a question of language – it is foremost a question of framework, and thus, which benefits and costs are considered and included. Not only are there sharp differences in the frameworks of economists and health advocates, but there are similarly sharp differences between value judgements sometimes employed by economists and the social welfare preferences of Australians as revealed by historical and current legislation in all parliaments;

- we explore the incidence of potential changes in benefits and costs associated with alcohol tax reforms disaggregated by consumer drinking pattern (i.e., Non-drinkers, and Moderate, Hazardous and Harmful drinkers) for the Australian adult population. Thus we examine the case for reform in terms of winners and losers. Governments wish to be informed of the incidence and magnitude of impacts, benefits and costs across the community before making policy decisions; and

- we bring the potential to reduce the collateral damage suffered by persons other than the drinker (HTO) into the scope of an economic BCA. Thus, we refocus the public policy debate from health harms to drinkers to those harms of most concern to the general public, i.e., on the disturbance, violence, the costs of running Australia's child protection, criminal justice and insurance systems, the opportunity

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[24] Our framework and benefit cost analysis builds on the approach used by the Productivity Commission in its analyses of gambling. For a full description of the Commission's approach see its earliest report on the subject, Productivity Commission (1999). Particularly note that the Commission's analysis also explicitly accounted for tax adjustments to the welfare analysis.

cost of having to look after drinkers, and other forms of collateral damage associated with excessive, short-term and episodic drinking, i.e., bingeing.

Just as smoking can harm a third party through passive smoking, a person's alcohol consumption can also affect third parties through a range of harms such as alcohol-related violence or the alcohol-related costs of running Australia's child protection, criminal justice and insurance schemes. Whether described as third party or collateral harms, these particular external costs appear not to have been previously included in overseas evaluations and BCAs of alcohol taxation and regulation.

Details of the approach for the BCA are provided in Appendix A.

3.1.1   Private, public and social costs and benefits

The total costs/benefits of alcohol to society (social costs/benefits) comprise private costs/benefits (i.e., the costs/benefits for the drinker him/herself as a result of their decision to drink) and public costs / benefits (i.e., the cost/benefit to others due to that person's drinking).[25] This standard distinction between public (or external) and private (or internal) costs and benefits is commonly applied by economists. We will focus on the costs of drinking.

Private costs comprise those costs incurred by individuals from an action that they undertake. These costs are considered by the individual in making his/her decision to purchase/consume. These are expressed in terms of opportunity cost or highest valued option foregone. In the absence of externalities and other sources of market failure, this cost is valued at the price paid for the product. Other elements that might be included would be costs associated with the purchase (if the product can only be found in certain stores), value of time spent searching, the cost of getting to the store, etc.

Public costs (often referred to as external costs) represent the costs incurred by others beyond those considered and incurred by the individuals in a transaction. Typically, these costs are not considered by the individuals when the action(s) of purchasing and consuming alcohol occur. These external costs are a principal source of failure of markets to deliver outcomes beneficial for society as a whole. These do not include effects transmitted through the price system.

Social costs i.e., the total costs to society, comprise the sum of private and public costs.

The simple distinction between public and private costs needs to be carefully applied. In particular, health harms to the drinkers themselves cannot be dismissed from the public policy debate on efficiency grounds on the basis that they are internal costs. This is so because the ostensibly private costs of harms to drinkers are mainly paid for by others via Australia's tax and welfare systems and via the cross-subsidies in Australia's medical and other insurance systems. Health harms to drinkers are therefore not pure internalities,

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[25]   Consistent with the terminology adopted by the New Palgrave Dictionary of Economics, we define social costs as the total of all costs affecting a community, comprising private costs facing individuals in markets and public (external) costs.

rather they are transformed through the various subsidy mechanisms into indirect externalities. [26]

For society as a whole, these subsidies (also known of as monetary transfers) may net to zero, but for governments and for Non-drinkers and Moderate-drinkers these payments impose real opportunity costs through the budget constraints and the deadweight efficiency losses from higher taxation, including income taxation. Importantly, the subsidies involved mean that drinkers most certainly do not face or consider the full marginal costs of their drinking and associated actions. The size of these subsidies means that it is nonsensical to suggest that drinkers face and weigh the real cost of their actions when making their drinking decisions.

The cost of private harms paid for by others is a critical missing category in the public policy debate on alcohol. The potential to reduce these indirect externalities is a major source of potential benefit but is not directly addressed in this study.[27]

3.1.2   Economic perspective on the benefits and costs

Where a policy causes a reduction in consumption, the cost of the policy includes the loss of satisfaction from the reduction in consumption. A benefit of the policy is any cost savings from, say, the resulting reduction in the costs of HTO.

For economists, the distinction between private and public costs (i.e., adverse externalities) is one of several key fundamental distinctions. In contrast, health advocates focus on the aggregate total of social costs and do not seek to distinguish between private and public costs.

Figure 1 provides an economic perspective on the taxonomy of relevant benefits and costs from alcohol taxation reform.

For economists, the distinction between private and public costs (i.e., adverse externalities) is one of several key fundamental distinctions. In contrast, health advocates focus on the aggregate total of social costs and do not seek to distinguish between private and public costs.

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[26]   Even under the strict confines of economists seeking to focus purely on the efficiency objective in public policy, it is likely that more than half of the costs of health harms to drinkers are paid by others and as indirect externalities are pertinent to an efficiency focussed the public policy debate.

[27]   However, an element of these harms is considered in the BCA through the exploration of irrational decisions.

Figure 1: Economic perspective on the benefits and costs of alcohol consumption
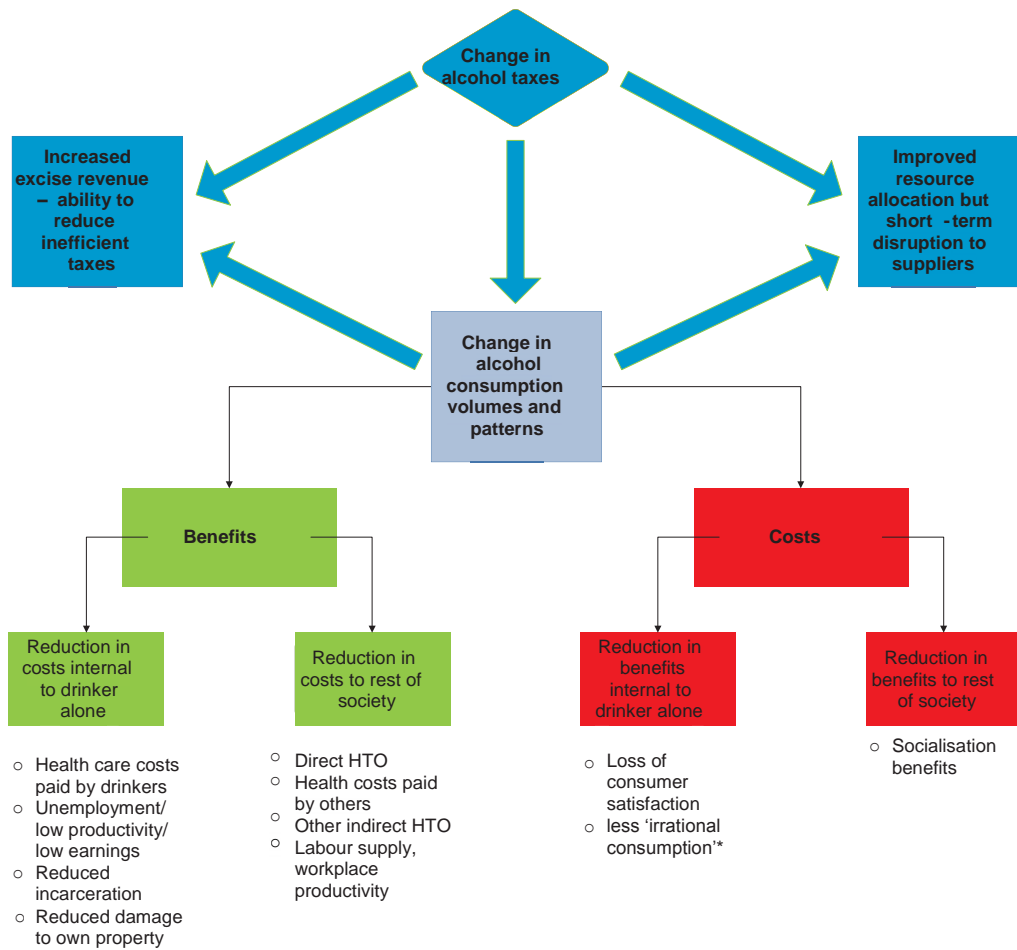
Notes: In the details under benefits and costs, bolded items indicate explicitly quantified in model.

   *   Irrational consumption is examined in the sensitivity analysis

For the economist, there can be no case for public intervention – **taxation system efficiency** and **resource allocation efficiency** aside – unless there is:

a)   **market failure** to deliver efficient outcomes due particularly to externalities, i.e., benefits and/or costs which are not reflected in market prices or contracts; and/or

b)   **preference failure** due to irrational preferences and imperfect information; and/or

c)   **non-efficiency objectives** such as distributional outcomes that also need to be achieved.

This is a further distinction between the frameworks of health advocates and economists: the former do not recognise as a benefit the satisfaction that consumers gain from consumption of alcohol. In contrast, economists emphasise the net reduction in consumer satisfaction, due to increased taxation and higher prices or other policy interventions.

The several differences in approach (noted above) are differences between essentially all economists as a group and health advocates who follow the cost of illness tradition as codified by the World Health Organization (2000) (WHO).[28]

3.2 Economists' value judgements vs revealed social preferences

While there are marked differences in approach by health and economic professionals, there are also differences between how economists often look at this issue compared with the judgements and preferences of Australian society.

Consistent with the purpose of BCA to measure changes in the welfare of society as a whole we reject many of the more extreme assumptions promulgated by some economists, on the grounds that their assumptions and value judgements are not consistent with observed facts or the considered and consistently revealed social welfare preferences of Australians. A fuller discussion is provided in Appendix D.

Thus, **we reject** that:

- families make the decision on how much individuals drink;[29]

- there is no case for public intervention to protect or reduce family violence because family members choose to stay in an abusive relationship or risky situation. We have rejected this value judgement because it does not accord with the judgement of Australians – as expressed, for example, in the legislation of all Australian parliaments; and

- the inclusion of criminal gains as benefits to society in a BCA.

We have chosen not to explore these extreme value judgements, since they do not reflect either the facts or the considered and consistently revealed social preferences of the Australian community. Bluntly, we do not wish to give the extreme judgements airtime and validity in serious public policy analysis.

Nonetheless, the frequency of extreme value judgements highlights first, the need to make explicit the value judgments in benefit cost analysis. Secondly, it highlights the need to recognise that BCAs – and public policy discussion – should not employ assumptions which might be considered quite inconsistent with social preferences. i.e., community norms.

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[28] As noted by Whittington and MacCrae, (1990). "*Thaler and Gould (1982) break with the potential Pareto principle by arguing for an alternative criterion for health policy: life-years rather than preferences. Thaler and Gould point out … that the willingness-to-pay approach to valuation gives more weight to the stronger preferences of the sick than to the weaker preferences of the healthy for medical treatment. The application of the potential Pareto principle to matters of health policy would result in the placement of resources in efforts at cure rather than in more effective efforts at prevention and could lead to suboptimal investment from the point of view of saving or extending human lives. They appeal to the widespread (but non-Paretian) judgement that length of life can be a measure of value independent of the preferences of those whose lives might be at stake.*"

[29] Heien, D., & Pittman, D. (1989). "The economic costs of alcohol abuse: An assessment of current methods and estimates", *Journal of Studies on Alcohol*, Vol. 54, pp. 302-308. Recent Australian studies employing this assumption include otherwise mainstream economists such as Fogarty (2011), Freebairn (2009) and Clarke (2008).

Although drawing a line against some of the more extreme value judgements which have found their way into otherwise mainstream analysis, our basic stance is to examine the benefits and costs of alcohol taxation reform and rate increases in a way which otherwise minimises the degree of contention and to do so in a manner which is demonstrably conservative.

In addition, we have rejected the contention that benefits and costs can only be valued at market prices.

BCA requires that the benefits and cost of alcohol taxation reform are measured consistently in terms of what matters to Australians, i.e., the opportunity costs of what they might lose and their willingness-to-pay for potential benefits, such as improved quality of life. Other non-material things matter to people. Where there are perfectly formed markets, opportunity cost and willingness-to-pay are reflected in market prices. However, where markets are imperfectly formed due to significant externalities or other forms of market failure, market prices may not be observable and/or will not reflect opportunity cost or willingness-to-pay for society as a whole. Consequently, non-market valuations must be and are employed.

Valuation of benefits and costs using non-market prices is valid and required in order to examine public policy impacts on society's welfare. However, such valuations should not be simplistically compared with economic and financial aggregates based on market prices such as Gross Domestic Product (GDP) or company turnover.

3.3   Model overview

The MJA alcohol model comprises a set of interrelated modules that simulate elements of both the market(s) for alcohol and the welfare implications (i.e., benefits and costs) of the market outcomes of alternative policy options. The model identifies and simulates the multiple steps involved from the change in tax structure and excise levels to the net benefits or costs to Australian society and to each of four categories of consumers, i.e., Non-drinkers and three categories of drinker: Moderate, Hazardous and Harmful drinkers.

In the quantitative analysis presented here:

▪   the scope of the benefit is limited to reductions in costs of harms to others. Short term costs are restricted to those costs incurred within the year of the study (2009/10) and exclude longer term costs that may extend beyond this period (e.g., longer term health care costs for chronic conditions); and

▪   the primary costs of any increase in taxation and thus price, are the loss of satisfaction by consumers. Implementation costs are also recognised. An omission on the cost side is the short-term disruption to alcohol suppliers, particularly the suppliers of low-value wine.[30]

Thus, the model seeks to identify all costs but in this study we identify a subset only of the potential benefits from increasing taxation and reducing consumption.

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[30]   A working assumption in the study is that Australia is, for most beverages, a price taker. In the fully employed economy such as Australia, resources released by a reduction in the demand for alcohol can be expected to be reallocated relatively quickly.

The model simulates the impact of changes in taxation in a single year. The step change is assumed to continue for succeeding years. As such, there is no significant time element in the model and consequently, only a minor role for discount rates.[31]

3.4 The model: main modules

The multiple steps in the MJA alcohol model can be grouped into modules comprising:

- the alcohol market,
- harms from alcohol consumption; and
- welfare and distributional effects.

The alcohol market

The first main module of the model simulates the workings of the alcohol market(s). It allows changes in tax policy to be translated into price changes and estimates the changes in consumption in response. Then, combining base levels of consumption with the percentage change in quantities, the changes in government revenue are calculated. In the current version of the model, this element of the module (Policy change) allows for changes in excise/WET levels.

Harms from alcohol consumption

The second main module simulates how the effects of reduced total consumption affect bingeing consumption and in turn affect the aggregate level of each of the major HTO. The model allows the incidence of HTO to vary across consumer types either pro rata or under different variants of the evidence.

The model allows separate selection and specification of the base level of individual costs items and how these costs respond to changes in episodic, longer term and total consumption.

Because economists are typically concerned to distinguish between private (internal) and public (external) costs, the model also allows the available estimates to be partitioned, accepted in full or part only.

As noted, this study focuses on the effects of episodic consumption on harms.

Welfare and distributional effects

Finally, the two main elements are combined to examine the effect of the changes on social welfare. The figures for consumer surplus change are disaggregated into the change in government revenues and the net change in surplus. As noted, the model allows the changes in welfare to be separately identified for different consumer groups. The gross consumer surplus estimates are directly transferred from the demand equations.

However, the estimates of change in taxation collected are based on changes in volumes consumed from each consumer group. The aggregate increase in tax revenue (less the annuity of implementation costs) is redistributed pro rata by population (adult) in each

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[31]   This is to derive an annual equivalent estimate for the implementation cost.

consumer group (including Non-drinkers). Secondly, the level of harms caused by drinkers to others is attributed across consumer groups. Again, these may be set in proportion to their relative populations or weighted, for example, by recent Australian estimates of relative incidence of harms across drinker categories.

3.5   The model: step-by-step

The key steps involved in the current version of the model are the:

- **the policy change**, i.e., the change in the WET and the excise levels and their impact on the prices of each beverage sold on- and off-trade;

- **implementation costs** for government and for private suppliers;

  (The next two steps in the model require knowledge of base volumes of consumption; own price and cross price elasticities of demand [or alternatively, demand system estimates]; and to preserve the initial budget balance, a decision on the use of the increased tax receipts.)

- **resulting change in demand**, the interaction of the policy experiment with the price elasticities of demand allows estimates in the changes in price and volume of alcohol consumed by each category of drinker. The estimates are then summed to estimate total changes; and

- **welfare changes**, i.e., resulting changes (for all consumers and for each consumer category) in volumes consumed in total and by beverage, taxes paid, and consumer surplus. When prices increase from higher taxation and the volume demanded is reduced, consumers derive less net satisfaction from their consumption of alcohol.

  As noted, the methodology of economics measures consumer satisfaction by the concept of consumer surplus which is driven by the difference for each consumer between willingness-to-pay and price paid over the volume consumed. The model's demand system therefore provides the foundation for the estimate of the welfare change (change in consumer surplus) from each policy experiment.

  For the purposes of this analysis, a simple estimate is made based on start and finish prices and volumes. The public policy focus is typically on the net loss of welfare (otherwise known as the Harberger Triangle[32] for single goods).

  Since there are multiple beverage types and cross-price elasticities are relevant, simple calculations based on the respective Harberger Triangles will overstate the magnitudes of both the gross and net loss of consumer surplus. We are happy with this overstatement as it introduces a degree of conservatism against the case for increasing alcohol excises and prices.[33]

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[32]   Where the higher taxation revenue is used to reduce the total tax burden for, say, all taxpayers, the gross loss of satisfaction/welfare can be offset, e.g., as a lump sum payment to taxpayers. See Harberger, A.C. (1964) "The measurement of waste", *American Economic Review*, May, Vol. 54 No.3, pp. 58-76 and later Harberger, A.C. (1971) "Three Basic Postulates for Applied Welfare Economics: An Interpretive Essay," *Journal of Economic Literature* Vol. 9, No. 3. (Sept)., pp. 785-797.

[33]   This analysis has benefited from discussions with John Freebairn.

The method by which the increased excise revenue is returned to consumers/taxpayers determines both a) whether or not there are additional efficiency benefits and b) the distribution of the return of the increased revenue across consumer groups (see Box 3). Our base analysis assumes a lump sum rebate, i.e., no efficiency gains;

Box 3: Use of funds from increased excise revenues

The increase in excise revenues can be used several ways, notably returning money to taxpayers or improving the balance of government budgets. Options to return the increased excise revenue to Australian taxpayers include:

- **a lump sum rebate to each taxpayer each year**. As recognised in Harberger (1964), this rebate would offset most, but not all of gross loss of consumer surplus. Since the rebate is a lump sum, there are no changes in the tax systems of either the Commonwealth or the States. There are no changes in budget balances. There is no substitution of a more efficient tax for a highly inefficient tax. Thus, there are no efficiency gains;

- **an equivalent increase in post tax incomes** through a reduction in Commonwealth income tax. Again, the reduction in tax paid would offset most of the gross loss of consumer surplus. This may benefit taxpayers, but not non-taxpayers, *ceteris paribus*. The exact incidence across taxpayers would depend upon precisely how rates were reduced along the income scale. The incidence of these rate reductions could range from very similar to that of the lump sum rebate to very different. However, unlike the lump sum rebate, reductions in tax rates would reduce the deadweight burden of the tax system and thus yield a potentially significant efficiency gain; and

- **an equivalent reduction in State taxes** through the Commonwealth granting to the States the equivalent of the increase revenue from alcohol excises. State taxpayers would benefit from both the money not paid as tax and the reduction in the very high marginal burden of payroll tax and other state taxes. Since state taxes, particularly the transactional taxes, cause a much higher deadweight efficiency loss than does Commonwealth income tax, a larger efficiency gain would result. As with a reduction in Commonwealth income tax, the distribution of this benefit across the adult population would, however, be less even than achieved by a lump sum benefit paid to each taxpayer.

None of the tax-based methods of rebate deal with pensioners or others who are not earning income.

- **rational and informed decisions?** Estimates of the magnitude of consumer surplus typically assume that consumer preferences are sovereign and that consumer decisions are rational and fully informed. The MJA alcohol model allows these assumptions to be relaxed and exploration of the impact of different levels of irrationality on the estimated magnitudes of the changes in consumer surplus;

- **different harms may be generated** by long-term consumption levels, binge drinking or reflect both. (The model currently does not include changes in health outcomes, although this module could be included when available or independently developed). To understand how reductions in total levels of consumption affect harms to others, we must estimate the change in volumes of risky drinking and how the level of collateral harms responds to the changes in these volumes. In addition

across consumer groups, changes in long-term consumption may cause different changes in binge consumption:[34]

- **apportionment** of the change in total consumption between binge drinking and longer term average levels of drinking;[35]

- **dose responses**, i.e., change in the level of costs of collateral HTO as a result of the change in the volumes consumed in binge drinking;[36] and

- **incidence of collateral harms**, i.e., the distribution of the change in the cost of collateral harms across consumer categories recognising the widespread report and survey evidence that heavier drinkers are more likely to be victims of other drinkers behaviour.

Figure 2 provides a schematic view of the model and its elements.

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[34] For example, a five per cent reduction in long-term consumption for moderate drinkers may result in a similar reduction in binge drinking, but the same reduction for Hazardous drinkers may result in, say, a larger proportionate reduction in binge drinking.

[35] In contrast, the driver of changes in consumer satisfaction is change in total consumption of alcohol (which includes both episodic consumption and long-term consumption).

[36] Our focus on dose response relationships acknowledges the level of alcohol consumption is a major factor leading to higher levels of HTO in a society. Other factors are at play – these are assumed to remain constant. A fuller listing of the factors explaining changes in the levels of HTO over time or across societies/communities would include :
- the level of total alcohol consumption;
- the level of bingeing consumption. This volume could be split between volume per bingeing event and frequency of bingeing;
- that those who binge drink every other day will be at risk of long-term harms from their consumption while those who binge drink monthly will not;
- learned behaviour on what is expected/tolerated/rewarded/condoned for key behaviours when intoxicated. These expectations will vary across a community and between harms (e.g., murder, rape, violence, property damage, nuisance and noise); and
- the opportunity in the local situation/environment for bad behaviour. For example, a specific factor increasing opportunity for HTO is the victim's level of drinking. The ability to change the local environment for bad behaviour is the basis for 'situational crime prevention' strategies and for locally based regulatory approaches to harm reduction.

Across societies and over time, bingeing and the permissiveness of attitudes towards bad behaviour when intoxicated appear likely to be highly correlated. The high levels of bingeing are unlikely to occur in societies which are highly intolerant of either alcohol or bad behaviour when intoxicated. However, attitudes do change.

Figure 2 : Schematic of components of MJA Alcohol Economic Simulation Model – change in HTO
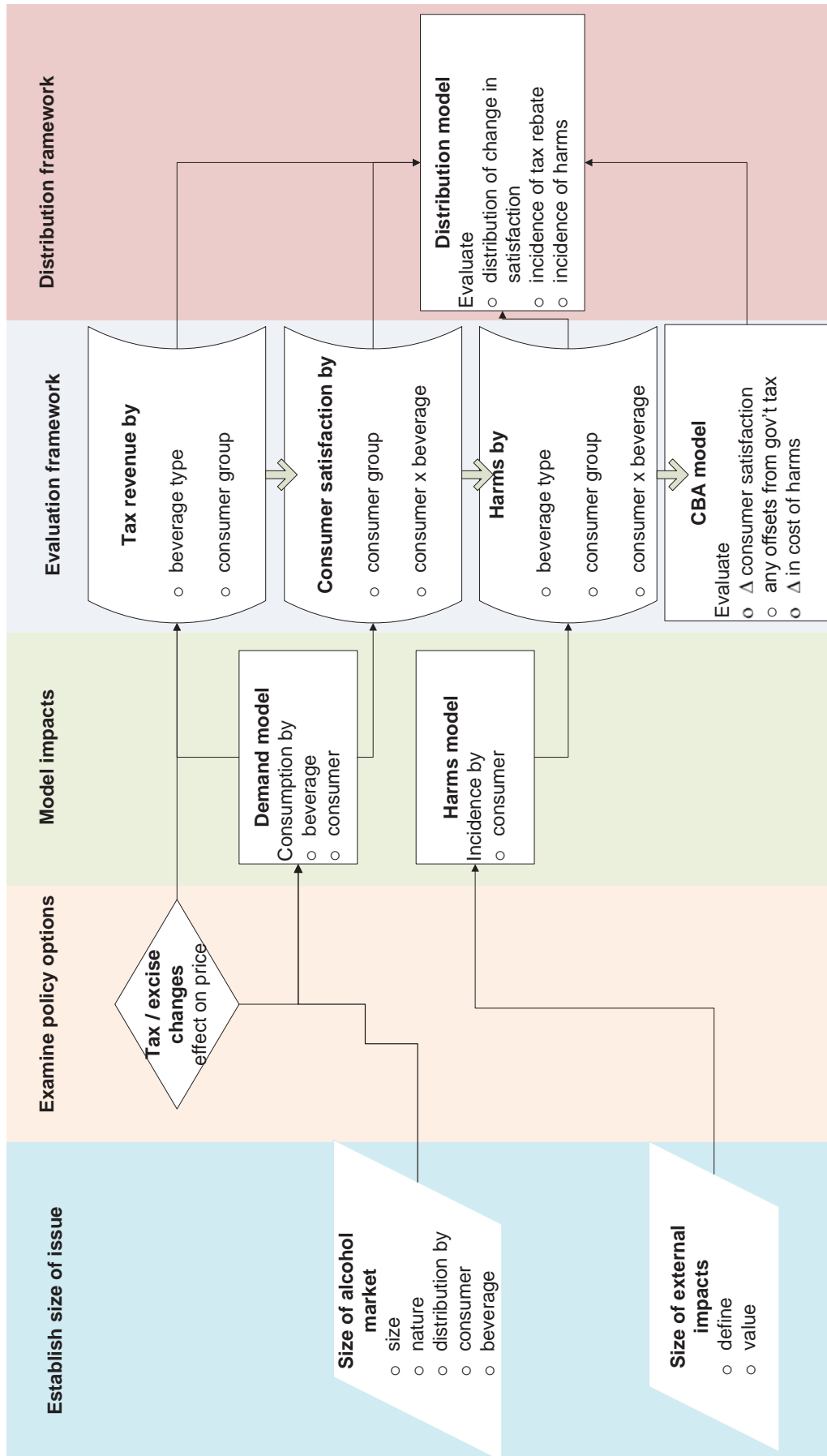
4. Data sources: options and choices

4.1   Data requirements

The MJA alcohol simulation model requires appropriate data and parameter estimates relevant to, in this case, the change in the cost of HTO. These include:

- base levels of consumption in terms of values and quantities by beverage;

- cost margins and the translation of changes in taxes and excises to changes in prices for each beverage sold on and off trade;

- consumption by drinker category distinguished between short-term episodic drinking from longer term average drinking levels;

- own price (and desirably cross price) elasticities by beverage and drinker category;

- costs of HTO. (Since not all harms are included, the criteria for inclusion/exclusion need to be explicit as does the understanding of the resulting inclusions and exclusions);

- the apportionment of changes in total consumption to changes in short-term episodic drinking volumes, i.e., bingeing volumes;

- the dose response relationships, i.e., how the level of each of the major collateral harms changes as bingeing volumes change; and

- the incidence of the change in harms across drinker categories.

We set out the options, challenges and choices for each of these data items below.

4.2   Base consumption volumes and values by beverage

The base level of consumption of alcohol derives from a number of key sources. The lack of official data on the sales value of alcohol necessitated a hybrid approach to its estimation.

The core sources are:

- the Australian Bureau of Statistics (ABS) series on Apparent Consumption of Alcohol and Consumer Price Index data for alcoholic beverages;

- Australian Taxation Office (ATO) estimates of excise collected (and the volume of alcohol to which that relates); and

- industry estimates of sales value.

Price increase data for calendar 2007 and 2009/10 were used to scale value data from Euromonitor sales value figures and growth in ABS apparent consumption volumes.

Table 1 outlines the values and volumes derived from this approach for each of beer, wine, spirits and ready-to-drink or pre-mixed beverages (RTDs).

Table 1: The Australian alcohol market – volume in LAL, value and average price of alcohol; 2010

	Beer	Wine	Spirits	RTDs
Volume (million LAL)				
Off-trade	62.7	55.4	17.3	7.9
On-trade	16.2	13.1	5.8	4.9
Total	78.9	68.5	23.0	12.8
Value ($m)				
Off-trade	8,183	4,453	3,039	2,660
On-trade	6,456	3,983	2,692	3,192
Total	14,639	8,436	5,731	5,852
Average price ($/LAL)				
Off-trade	130	80	176	338
On-trade	400	304	467	647
Total	186	123	249	457

Source: Euromonitor, ABS Apparent Consumption of Alcohol and MJA analysis.

The value and volume beverage data developed above were then apportioned across Australian consumer groups to match the three drinker categories defined in section 4.3 below. The result is estimates of the numbers and proportions of consumers in each group (including Non-drinkers) and their consumption in terms of both annual consumption and by episodic (short-term/binge) drinking.

4.2.1   Cost margins and the translation from tax to prices

Average prices (shown in Table 1 above) are estimated as the ratio of sales value to volume expressed in LALs.

The average excise for each beverage is measured by the ratio of excise receipts to average price. The ATO reports the excise collected for part of the expenditure on alcohol and the volume (in LALs) that it is collected from. This average excise take is applied across the total implied consumption for each beverage from the ABS. Underlying cost estimates are consistent with industry analysis of margins.

4.3   Consumption of alcohol by drinker category

To assess the impact of policy measures (such as an increase in the rates of excise) on alcohol consumption by different categories of drinkers, estimates of consumption for each category are required, desirably distinguishing between short-term episodic consumption and average levels of consumption.

For the purposes of this study, we have focussed on the impact of high-risk **episodic** drinking (or bingeing) defined by the NHMRC Guidelines as more than four drinks in a session.[37]

We have cross-classified **episodic** drinking levels against **long-term** average levels of consumption categorised as Moderate, Hazardous or Harmful.[38]

Moderate levels of long-term drinking are defined consistent with NHMRC Guidelines as average daily consumption of no more than two standard drinks. This threshold for long-term drinking equates to a risk of 1:100 for a probability of dying from alcohol-related causes from long-term consumption of alcohol. The basis for the NHMRC choosing this level of risk tolerance is shown in Box 4.

Box 4: NHMRC choice of risk benchmark

Lifetime risk is a commonly used standard for evaluating the risk associated with exposure to a particular substance or situation, for instance, in evaluating what are acceptable levels of environmental poisons or food additives. The arbitrary limit often used for environmental toxins has been a risk of death of 1 in 1,000,000: that is, that the chance of death attributable to a given level of exposure over a lifetime should be no more than one in a million. This standard is used in Australia for contaminants of drinking water (NHMRC 2004).

The fact that risk is perceived as multi-dimensional, and judged according to its characteristics and context, makes it difficult to convey concepts of risk at a population level. The NHMRC decided on a lifetime risk of dying from alcohol-caused disease or injury of 1 in 100 (i.e. one death for every 100 people) as the basis for guidance as to what could be seen as an acceptable risk from drinking in the context of present-day Australian society. Guideline 1 in general aims to keep drinking below that risk level for the drinker. This may be seen as too high or too low a risk by the individual drinker. This report also presents tables and figures that show how the risk of harm varies, for those who wish to guide their drinking by another level of risk.

Source: National Health and Medical Research Council 2009*, Australian guidelines to reduce health risks from drinking alcohol,* pp. 34-35.

The NHMRC Guidelines do not explicitly distinguish between different levels of high-risk long-term drinking. However, this distinction is necessary in order to investigate the relationship between price, consumption and harms across the adult population. In distinguishing between Hazardous and Harmful long-term drinking we have chosen the same thresholds as used for England and Wales by the Sheffield team (see

Table *2* on next page). These also distinguish between male and female drinkers which the NHMRC Guidelines do not.

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[37] The NHMRC Guidelines (2009) note that with a drinking pattern of four drinks on an occasion about once a week, the lifetime risk of hospitalisation from injury alcohol related injury is about 1 in 10 for men and 1 in 12 for women.

[38] There is variation between studies, countries and over time in the thresholds and terms defining drinker categories. Different thresholds and definitions relate to participation, frequency and volumes consumed in the episodic and longer term. See World Health Organization, 2000. *International guide for monitoring alcohol consumption and related harm,* WHO, Geneva

In summary, we define long-term average drinker categories as:

- **Moderate drinkers** as those who consume an average of two standard drinks or fewer per day. This is the NHMRC Guideline for alcohol consumption to reduce the risk of alcohol-related death over a lifetime to no more than 1 in 100;

- **Hazardous drinkers** as those whose average consumption exceeds those of Moderates but is less than 40 standard drinks per week for males and 28 standard drinks per week for females;[39] and

- **Harmful drinkers** as those drinking more than Hazardous drinkers.

The (weekly) Sheffield categories can be expressed in terms of daily consumption and rebased to reflect the Australian definition of a standard drink (

Table 2).

Table 2: Categories of drinker used in MJA study

Drinker type	Average daily consumption	
	Male	*Female*
Moderate	Up to 2 standard drinks per day	
Hazardous	More than 2 and up to 5.7 standard drinks per day	More than 2 and up to 4 standard drinks per day
Harmful	More than 5.7 standard drinks per day	More than 4 standard drinks per day

Note: A standard drink is one containing 10g of alcohol. The definitions for Hazardous and Harmful were converted from the UK where the definition of a standard "unit" is one with 10ml of alcohol.

Since the drinker categories are based on average consumption each category of drinkers potentially includes some level of short-term episodic drinking in excess of the NHMRC Guidelines.

Table 3 summarises our analysis of Australian's drinking patterns as shown in the unit record data from the NDSHS data for 2010.

As noted, however, there is evidence of significant under-reporting of consumption compared with that reported by the ABS Apparent Consumption series. Total reported consumption in the NDSHS is around 57 per cent only of total apparent consumption. For the purposes of analysis, we have focussed on the proportions of consumption.

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[39] This definition reflects the classification used in the Sheffield study in the UK to disaggregate heavier drinkers.

Table 3: Australian drinking patterns – Proportion of alcohol consumed at Moderate, Hazardous and Harmful levels

	Long-term drinking pattern			
	Moderate	**Hazardous**	**Harmful**	**TOTAL**
	(% adult population)			
TOTAL	**64.7**	**11.7**	**4.1**	**100.0**[1]
Episodic drinking	(% of total alcohol consumed – across all categories)			
Less than 4 drinks	27.8	14.2	1.1	43.1
4 to 6 drinks	3.1	8.2	5.0	16.2
6 to 10 drinks	2.3	4.5	7.9	14.7
10 to 20 drinks	1.4	3.5	7.9	12.9
More than 20 drinks	1.2	2.7	9.1	13.1
TOTAL	**35.8**	**33.1**	**31.1**	**100.0**
	(% of alcohol consumed – across each drinker category)			
Less than 4 drinks	77.6	42.9	3.5	43.1
4 or more drinks	22.4	57.1	96.5	56.9
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**
"very risky" – 10 or more drinks	7.4	18.8	54.9	25.9

Source: MJA analysis of unit record data from 2010 NDSHS survey, expedited by guidance from Mr Michael Livingston, Centre for Alcohol Policy Research.

Note:

1   *Total adult population includes the 19.5per cent of the adult population who are Non-drinkers (Question E5).*
    In close agreement, the survey questionnaire on actual volumes drunk (Question E17) suggests that 20.5 per cent of the adult population did not drink. The estimates have been scaled to align with the 19.5 per cent estimate.

Our analysis of Australian drinking patterns indicates that:

- whereas almost 20 per cent of adults surveyed report no drinking, the 15.8 per cent of the adult population who are the heaviest drinkers consume 64 per cent of self-reported consumption; and

- across the population of drinkers, the higher the average level of consumption, the higher the proportion consumed in episodes of high-risk drinking.

    For persons who report that their average levels of drinking as Moderate (i.e., below NHMRC Guidelines for reduced risk of long-term harm), just more than 20 per cent of their total consumption is episodic at risky levels. In contrast, some 97 per cent of consumption by Harmful drinkers is in episodes at risky levels. Indeed, over half of their consumption is in bouts of 10 or more drinks.

Discussion

The categorisation of people by drinking levels is a convenient but arbitrary tool. We note that there will be variations within the categories however defined, e.g., people may still behave quite differently and experience (or cause) differing levels of harm.

For instance, Moderate (long-term) drinkers may at times engage in drinking behaviours that risk short-term harms. While these Moderate drinkers have a lower risk/incidence of harm than heavier drinkers, the fact that they represent the majority of drinkers means that they consequently can cause significant harms to their health and productivity and to others.

Applying the long-term average drinking thresholds defined above to unit record data from the Australian NDSHS, we find that in 2010, Moderate drinkers alone accounted for over 90 million bingeing events in that year (Table 4).

This is around 16 per cent of the total number of bingeing events, the events overwhelmingly associated with the costs of collateral harms, i.e., harms to persons other than the drinker.

Thus defined, Moderate drinkers appear likely to cause substantial acute harms to others as a result of bingeing. Moreover – and in the other direction – to the extent that the incidence of harm is related to the victim's level of drinking, particularly short-term episodic drinking, Moderate drinkers who binge are at increased risk (compared with Moderates who do not binge) of suffering harm as a result of the bingeing of others.

While Moderates may be responsible for many bingeing events, Hazardous and Harmful drinkers are responsible for many, many more. Hazardous and Harmful drinkers account for the vast majority of these events and the Hazardous and Harmful levels of drinking harm both the drinkers and others.

Indeed, drinkers whose long-term consumption is harmful to themselves account towards half of all bingeing events, i.e., sessions where consumption is in excess of the NHMRC Guidelines. Other things equal, this suggests that the heaviest drinkers are not only harmful for themselves, but are likely to impose the greatest proportion of harms on others. As noted above the NDSHS data indicates that Harmful drinkers rarely drink at less than bingeing levels.[40]

Table 4: The pattern of bingeing events across drinkers – Bingeing events by drinker category, Australia; 2010

Episodes of consumption over	Moderate	Hazardous	Harmful
	(Number of episodes)		
4 drinks	94,262,657	230,424,260	256,193,294
6 drinks	37,466,605	78,770,945	163,963,145
10 drinks	12,174,795	28,594,979	75,785,410
20 drinks	4,450,125	9,873,061	33,106,053

Source: MJA unit record analysis of NDSHS 2010.

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[40] Persons consuming at harmful average levels consume almost nothing in bouts of less than four standard drinks. Indeed, well over half of consumption by Harmful drinkers is reported to be in bouts of 10 drinks or more.

4.4   Own price and cross price elasticities of demand

Changes in quantities of alcohol demanded following a change in own price or in the price of close substitutes/complements are described in terms of elasticities, i.e., the percentage change in the quantity demanded divided by the percentage change in respectively own price or the cross price.

Own price elasticities for alcohol are generally estimated to be inelastic, i.e., a less than proportionate response in quantity with respect to the price change. However, there are a number of uncertainties regarding price elasticities for alcohol:

▪   while economists tend to focus on the relationship between price and quantity, alcohol behaviour is more complex. It would seem necessary to distinguish between the role of price on whether people participate or drink at all. The impact of price on total volume, and the impact of price on the levels and frequency of high volume episodic drinking, i.e., bingeing.[41] Ideally, elasticities should be defined separately for each level of decision;[42]

▪   an estimate of an elasticity generally refers to responsiveness at that price level and for small changes in prices. It can be problematic to use a constant elasticity estimate across large price changes. Practical observation suggests that the price elasticities decline as prices rise. The use of constant elasticities will therefore tend to lead to an overestimate of the responses of quantities to large changes in prices. System estimates – as distinct from single equation estimates – allow elasticities to vary in accord with the parameters and logic of an integrated and internally consistent system of demand and should therefore be preferred methodologically. However, demand system estimates are infrequently available and frequently excluded in meta analyses;

▪   major policy reforms such as abolishing Australia's WET would involve significant shifts in the relative prices of different beverages, i.e., the price of cheap wine would rise significantly. Where there are significant shifts in relative prices, the cross price elasticities between wine and other alcoholic beverages become more relevant. However, few of the meta analyses report both own-price and cross-price elasticities for alcohol. Further, few of the direct estimates of price elasticities (as distinct from those from demand systems) available for Australia provide cross-price elasticities between wine and other beverages;

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[41]   See Manning et al (1995).

[42]   Unless we can distinguish the long-term elasticity of participation with respect to price from the elasticity of volumes demanded by participants with respect to price then by focussing on the latter only we will tend to underestimate the aggregate magnitude of price responsiveness over the longer term.

To illustrate, suppose, for example, that a) once a drinker always a drinker, b) first participation/commitment to drinking is highly responsive to price, and to the extent of drinking across the adult population as a whole, c) little or no response to prices in volumes consumed by drinkers once committed, and d) we estimate price responsiveness using, say, 5 years of panel data.

Under this construct/set of assumptions, price would, by assumption, be a highly effective instrument over the longer term since it would affect whether people drank or not - but we would not observe much change in the short to medium term. Indeed, to understand what is happening we would need to focus on the impact of price on the participation decisions of successive entry cohorts.

- there is consistent evidence that drinking levels and frequency tends to decline with age, but there is conflicting evidence on how elasticities may vary between groups based on levels of alcohol consumption. Are Hazardous drinkers more or less responsive to price compared with Moderate drinkers? This is a critical question for this study since we wish to understand how the benefits and costs differ between different categories of drinkers. There is a widespread belief that heavy drinkers are (more) price inelastic, although the econometric evidence is mixed and, in part, seems to vary between estimates of the demand systems and single equation estimates of point elasticities;[43]and

- there is limited information on the relationship between price and bingeing in both behaviour and volumes in the Australian or international contexts. Much of the analysis in Australia and overseas has focussed on the availability of (cheap) alcohol and excessive drinking by young adults, particularly males. We have not disaggregated our analysis by age but note that reduced HTO are particularly likely to derive from reduced bingeing by young males.

  Consequently, we have focussed on the impact of price on average consumption in Australia and then discussed the likely impact on episodic drinking.

The fresh estimation of a new set of elasticities or the undertaking of a new meta-analyses of available elasticities is beyond the scope of this study. Several options were considered in this study to source elasticity estimates for Australia include:

- primary sources:
  - estimation of elasticities from survey data (see Selvanathan (1991), Selvanthan and Selvanathan (2004), Salvanathan and Clements (1995), and Richardson & Crowley (1994);
  - estimation of linear demand systems with multiple consumer groups. See the Sheffield studies for England and Wales (Sheffield 2008a and 2008b), and Scotland (Sheffield 2010);[44]

- secondary sources:
  - meta analyses of multiple studies estimating elasticities. See Wagenaar et al (2009) and Gallett (2007) for international analyses. See Fogarty (2004 and 2008) for Australian based meta analyses. Fogarty (2011) provides estimates for own price elasticities for three beverage types and three drinker categories, but reports only two cross price elasticity, namely RTDs to spirits and spirits to RTDs; and
  - using elasticities taken from either available estimates for single equation models or from the available linear demand systems estimates. Byrnes (2010) used this approach, using estimates from Richardson and Crowley (1994).

Our analysis found that these several options pose quite different tradeoffs: a) system estimates are generally preferable to estimates of point elasticities, however, the currently

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[43] See Chaloupka, *et al* (2002).

[44] Note, the Allen Consulting model developed for FARE currently examines consumption in total rather than by consumer group. That model estimates a demand system including direct data for three beverages with own and cross-price elasticities for a more finely distinguished breakdown of beverages.

available systems estimates for Australia do not distinguish between drinker categories; b) Fogarty (2011) distinguishes both drinker categories and beverage categories, but since his estimates and interpolations are meta-analysis based they may not be internally consistent and, as noted, he reports only a single pair of cross price elasticities (spirits vs RTDs); and c) the Sheffield system estimates reflect beverage expenditure shares which differ significantly from the Australian situation.

We have invested considerable effort in seeking to apply the richness of the Sheffield demand system estimates to the Australian situation. However, we were left with concerns – both in principle and in any resulting estimates – whether these estimates are valid.[45]

The elasticity estimates adopted in this study (Table 5) are centred on the Fogarty (2008) meta estimates of own price elasticities for beer, wine, spirits and RTDs. To derive elasticity estimates for each of the three drinker categories we have followed Fogarty (2011) in relying on Manning *et al* (1995) but varied the methodology applied by Fogarty and updated the weights to reflect our more recent 2010 estimates of alcohol consumption patterns (see below). The resulting estimates differ from Fogarty's not only because they reflect updated data on consumption patterns and apply to three drinker categories rather than two, but importantly the estimates reflect the mid-points of the distribution of Australian drinker categories, which Fogarty's did not. As a result our elasticity estimates are similarly lower for heavy drinkers than for Moderates but show smaller differences than suggested in Fogarty (2011).

Table 5: Responsiveness of consumption to price changes – Own price elasticity estimates used in MJA model

Drinker: Beverage:	Moderate	Hazardous	Harmful	Overall
Beer	−0.4971	−0.3926	−0.2628	−0.37
Wine	−0.5374	−0.4244	−0.2841	−0.40
Spirits	−1.2897	−1.0186	−0.6819	−0.96
RTDs	−0.8934	−0.7056	−0.4724	−0.67

Source: MJA analysis based on Fogarty (2008), Manning (1995) and unit record analysis of NDSHS (Table 3).

Since the Fogarty meta-analysis estimates do not provide cross-price elasticities between wine to other beverages, we cannot model cross-substitution. The lack of cross-price elasticities between wine and other beverages means that the simulated changes following changes in tax levels represent:

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[45] As an example, from first principles and as confirmed by model simulations, we found applying UK estimates of elasticity of beer demand with respect to changes in the price of wine to explore for Australia the impact of replacing the WET with a volumetric excise will overstate the change in **beer** consumption because a) the UK cross-price elasticity is not fixed but would reduce as the expenditure share of beer consumption rises (and conversely) b) the point estimate of the UK cross-price elasticity is not consistent with the much higher share expenditure in beer in Australia than in the UK. This is why using a demand system is preferable to using any one set of the point estimates of elasticities that may be obtained from that demand system or to using separately estimated parameters.

- the worst case for consumers since they are unable to switch to other beverages and thus to mitigate their loss of satisfaction;

- the worst case for other beverage suppliers since recognition of cross price substitution would mean that their demand would, in fact, be higher;

- for the abolition of the WET and its replacement by an excise rate equivalent to package beer, the worst case for government because excise tax rates on other beverages are set higher per unit of volume and tax revenues would be higher. Conversely, however, the impact on the producers and sellers of very low-priced wine of abolishing the WET will be understated since many consumers of very low-priced wine may switch to other low-priced beverages; however,

- the reduction in the volume of alcohol consumed and thus the change in the levels of harms is overstated.

These biases are linked and move in cross-step so that while the absolute levels of benefits and costs may be overstated the relativities between benefits and the costs from loss of consumer surplus and disruption to business are not expected to change.

However, some costs, specifically implementation costs, appear likely to be fixed.

In summary, our estimation and use of Fogarty centred elasticities has the advantage of being conservative in terms of the estimated changes in consumer welfare and the advantage of being simple to apply while retaining the ability to investigate the distribution of benefits and costs across different consumer groups. The impact on different winegrowers, particularly the producers of cheap wine, would need to be systematically examined in a more detailed study. [46]

Because of the heightened interest amongst economists of the concept of price elasticity, our simulations (reported in chapter 5) and sensitivity analyses (reported in Appendix H) explore a wide range of alternative elasticity parameters. To anticipate the results, we find that qualitative assessment of net benefits unchanged in response to different elasticity values.

4.5   Base estimates of costs

As noted, this study focuses purposefully on the impact of tax and excise changes in reducing the costs of HTO. This deliberately narrow focus on the external costs of a drinker to others means that we have excluded the total cost of harms to the health of the drinker and the workplace associated costs of drinking to the worker. This blanket exclusion is made for the purpose of simplification, to minimise unnecessary, distracting debate and to ensure focus on collateral harms to others which have previously received too little attention by economists and the policy debate.

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[46]   See Davidson, R and Dennis, R (2011) *The Australian wine tax regime: Assessing industry claims*, Australia Institute study for FARE, Technical Brief No. 10, September.

4.5.1 Criteria

We have also set a high bar for inclusion of the available estimates of the cost of HTO. Broadly, we have used the following criteria in filtering the source data on collateral HTO from short-term episodic drinking and associated behaviours:

- data are clean, beyond dispute, and preferably directly collected;

- no double counting/well documented and transparent;

- forward looking and changeable; and

- estimates are conservative with any bias meaning under-estimation of costs.

Specifically, cost estimates which might be contaminated by private costs (e.g., cost of motor vehicle accidents) are generally excluded. Similarly, cost estimates where the choice of estimation methodologies is controversial or has not yet been applied systematically and appropriately in Australia are excluded. This reason for exclusion applies to the costs associated with drinking in the workplace (see Appendix B).

The multiple costs to society as a whole resulting from drinking can be summarised in three broad groupings. These are:

- **harms to drinkers' health:** These costs comprise the multiple harms to drinkers' health. Through the numerous cross-subsidies in the Medicare, private health insurance, the medical safety net, disability and age pensions, the costs of health harms to drinkers are only partially borne by the drinkers themselves. This large category is primarily driven by levels of long-term drinking;

  The cost of harms to the health of the drinker are excluded from the cost base used in this study – even where the bulk of these costs are paid by others;

- **costs of absenteeism, workplace accidents and productivity loss attributable to alcohol consumption:** These costs include private costs to the drinker, external costs imposed on the drinker's family and succeeding generation(s) and external costs imposed on other employees, the business and the wider economy, particularly at times and in regions of full employment. These costs are primarily driven by the levels and frequency of short-term episodic drinking, i.e., bingeing.

  Thus for the purposes of this study, costs relating directly to the drinker in the workplace are excluded – as are the costs to business, taxpayers and the wider economy. However, costs relating directly to workers other than the drinker are included; and

- **the costs of harms to others**: The potential to reduce the short-term costs of HTO is the sole source of benefits examined in the model simulations of benefits and costs.

4.5.2 Costs of harms to others

Laslett *et al* (2010) provides an extensive list and accounting of the costs of HTO for Australia. This list extends and complements (with some overlap) the estimates provided by Collins and Lapsley (2008) on the costs of harms to drinkers and others.[47]

As noted, for the purposes of the current analysis, we have focussed on selected HTO.

The methods and costings from Collins and Lapsley (2008) and Laslett *et al* 2010 have been criticised by Access Economics (2010). Broadly, we consider that several of the substantive criticisms of Collins and Lapsley (2008) are warranted. Of potentially more relevance to this study, with its focus on HTO, are the criticisms by Access Economics of the Laslett *et al* study. These criticisms were contested by the authors. We have reviewed in detail the original Laslett study, the criticisms and the responses (see Appendix B) and in summary, we conclude that the criticisms are either incorrect or immaterial. We also conclude that the Laslett *et al* estimates are a robust and solid basis for understanding the costs of HTO in Australia.

Our estimates of the harms to others include:

- **motor accidents:** The role of alcohol in motor accidents is well known and has led to the introduction of blood alcohol content testing regimes in Australia and elsewhere. Despite these regimes, alcohol continues to play a major role in motor accidents. These costs include: damage to vehicles and other property, injury, hospitalisation and loss of life to drink drivers and to others. The associated costs are both private to the drinker and external to others.

  The cost of motor vehicle accidents estimated by Collins and Lapsley (2010) has been excluded from the cost base in order to exclude any costs incurred by drinkers. We have included the cost of loss of life and hospital/health costs of others. Laslett *et al* provides estimates of the numbers of others killed as a result of road accidents, and we have costed these deaths at $3.5 million each;[48]

- **alcohol-related violence**: Persons other than the drinker are also killed and injured in alcohol-related violence. We have similarly estimated the cost of these deaths at the cost of loss of life and included hospital/health costs;

- **attributable administrative costs of the criminal justice and property insurance systems:** Alcohol promotes risk taking and stimulates criminal activity.

  These costs are driven primarily by short-term episodic drinking, are in addition to the drinker committing property and other crimes, and are included in the cost base for this study;

- **attributable costs of child protection systems**: The protection of children from neglect and abuse is a major responsibility of all state governments. Both in Australia and internationally, alcohol is found to have a substantial role in stimulating violence within the family and child abuse. Laslett *et al* has explored and documented the alcohol driven costs in detail for Victoria and provided

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47   Both are rebased, updated and integrated to avoid double-counting by Doran (unpublished) and further rebased here to 2009/10 prices.

48   See Abelson (2003) and Abelson (2008).

estimates for the whole of Australia. These costs are external to the drinker since they are paid for by state taxpayers. These costs are included in the cost base for this study.

- **burglary and robbery**: Alcohol has been identified as a contributing factor to property crimes such as theft and burglary. Mayhew (2003) derived estimates of costs of a range of crimes, including robbery, theft and burglary from a broad range of sources. We have adjusted these costs for inflation and the significant reduction in crime rates over the past decade. In addition, Collins and Lapsley derived attribution figures for alcohol (and for other drugs) to crime costs. We have used these attribution figures to scale the cost of these property crimes. In 2009/10, some $141 million of the costs of burglary, theft and robbery have been attributed in this study to alcohol;

- **property damage to others**: Alcohol is involved in a significant proportion of nuisance and violence and property damage to others. The property damage estimates are recorded by police and by victim surveys. Based on Laslett *et al*, estimates out of pocket expenses associated with property damage are estimated to approach $1.2 billion when indexed to 2009/10. These costs are external to the drinker and paid for directly by the victims or indirectly by victim premiums paid to insurers. These costs are included in the cost base for this study;

- **effects of drinking of family and friends on others:** These costs include out of pocket expenses; the cost of time lost or spent in dealing with the drinker and his/her issues; and loss of quality of life. These costs are external to the drinker. These costs are included in the cost base for this study.

  The extent of these harms was assessed in the HTO survey 2010 and quantified by Laslett *et al* whose cost estimates for time lost were based on hours spent and the hourly equivalent of AWE. We consider that Australians are willing to look after family friends and indeed strangers for less than the payment of AWE and have reduced Laslett's *et al* cost estimates to 10 per cent AWE only.[49]

  For loss of quality of life the hours lost or spent were valued by Laslett *et al* at $53,000 per quality life year. This is a substantial under-estimate because (as noted by Access Economics (2010)), the average value for a quality life year is substantially higher – Access Economics suggests a figure around $130,000 in 2009/10. Because of its conservatism we have retained the Laslett *et al* estimate; and

- **counselling of drinkers, family and friends**: The HTO survey 2010 records significant out-of-pocket expenses involved in counselling for drinkers and family and friends. These costs are included in the cost base for this study.

Table 6 outlines the costs of harms used in the model. After rebasing to 2010 prices, of the $18 billion calculated by Collins and Lapsley and the $19 billion calculated by Laslett *et al,* we estimate a conservative minimum total of around $15.1 billion in harms to others. The next step is to estimate how much these costs could be reduced through lower alcohol consumption. (For details see Appendix C.)

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[49] However, Access Economics (2005) estimated the costs of carers up to 4 to 5 times AWE.

These estimates relate essentially to the short-term costs of harms to others. In reality, it is likely that longer term costs to others, such as associated with care for those affected by long-term harms, will be material.

Table 6: The cost of harms to others used in MJA analysis

Sources of harms to others	Total cost of harms 2009/10 $m
– Child protection system	694
– Effects of drinking of household/family member or friend	
– out of pocket	437
– lost time[1]	964
– loss of quality of life[2]	7,703
– Theft, burglary	141
– Counselling, advice & treatment	113
– Property damage	1,673
– Loss of life	1,326
– Labour costs on others	828
– Hospital costs to others	159
– Policing & justice system	1,022
TOTAL	**15,061**

Source: MJA analysis based on Laslett et al (2010) and Collins and Lapsley (2008).

Notes: 1. Valued at 10 per cent of AWE.

2. Valued at $53,000 QALY.

In summary, the key set of harms excluded from this study is harms incurred by the drinker him/herself.

▪ The focus of our model simulations is on incontrovertible direct externalities arising from high-risk, short-term episodic drinking, i.e., bingeing.[50]

▪ Harms relating to long-term consumption are not modelled in the simulation estimates. Estimation of the health effects of changes in consumption over time would require an epidemiological module for the range of disease and harms incurred by the drinker to be included in the model.[51] (However, the changes in

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[50] There is significant discussion particularly in economic literature regarding whether drinkers include the likelihood of harm in their decision to drink. Moreover, to the extent that costs incurred by the drinker are paid for through either tax payer funded health care or cross subsidies from community-rated insurance, these costs should be reflected as an externality from the drinker's decision. As this is seen by some as significantly contentious issues, we have omitted these items from the cost base (from which we derive the benefits of policy change).

[51] Such an epidemiological model has already been developed for Australia. See Byrnes *et al* (2010).

consumer satisfaction and the tax revenue derived from long-term consumption are included).

- In addition, long-term effects of HTO are also not comprehensively included. In particular, on-going treatment, hospital and counselling costs from violence are not included in the estimate for HTO from violence to partners or third persons. On the other hand, it is not clear that some part of these costs would not relate to incidents occurring in previous years.

- The model does not include productivity effects from absenteeism or affected performance of the drinker. However, where absenteeism affects other workers either through increased hours or reduced quality of life, these estimates have been examined.

- The model does not include potential benefits from improved resource allocation or improvements in tax efficiency.

Appendix C details the specific inclusions and exclusions.

4.5.3   Implementation costs

Changes to the excise and WET regimes will impose upfront costs that would be met by the Commonwealth Government. We have adopted the estimate used by Byrnes *et al* (2010) of $18 million that reflects the cost of introducing a volumetric tax. Byrnes translates this into an annual cost of $580,000. We have used different discount rates and periods to those used by Byrnes and have 'charged' these costs as an annuity of around $1.44 million.

4.6   Simulation of changes in bingeing volumes

The model simulates changes in total consumption by beverage following the increase in prices caused by the policy experiments. Thus, consistent with the focus on HTO, there needs to be a translation from the change in total consumption to the change in short-term consumption volumes.[52] A pro rata approach is used in our base case estimates.

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[52]   Options to achieve this translation include:
- the simple assumption of a proportionate, i.e., pro rata change; and
- adoption of the method used by the Sheffield team for the same purpose. See Sheffield (2008b), pp. 46-47 and Appendix 3.

The Sheffield method uses regression analysis of UK household expenditure survey data to estimate the derived change in short-term drinking volumes following the change in total consumption. Specifically, the Sheffield team undertook a simple least squares analysis of the relationship between average consumption and <u>maximum</u> consumption in one incident. For a reduction of one drink in average consumption, Sheffield (2008b) estimates that the reduction in maximum short-term drinking is:

Moderate = 2.3 drinks   Hazardous = 1.2 drinks   Harmful = 0.6 drinks

The Sheffield results suggest that changes in average Moderate consumption will have greater impact on short term/episodic consumption by Moderates than from changes in Hazardous and Harmful average consumption. However as noted above, most risky episodic consumption is undertaken by Hazardous and Harmful drinkers – and 97 per cent of self reported consumption by Australians drinking at Harmful levels is bingeing. This is impossible to replicate using the Sheffield figures. Thus, the Sheffield results seem to make little or no sense for the Australian data.

4.7   Dose response relationships

Reductions in short-term drinking volumes are expected to reduce the identified harms to others. However, there is little published information available on the nature of the harm responses. Following Meier *et al* (2010), Purshouse *et al* (2010) and Fogarty (2011), we have assumed a linear or proportionate reduction in the cost of harms as a result of reductions in short-term drinking. Inspection of each of the items of HTO suggests that this is either an accurate reflection or a conservative judgement.

4.8   Incidence of harms across consumer categories

There is pervasive evidence that the victims of the harms from drinkers experience higher rates of harm and more severe consequences where they themselves have been drinking. For example:

- Laslett *et al* (2010) reports substantially higher rates of violence and consequences where the victims have been drinking heavily. Similar results emerge from police and other direct reports and from overseas surveys of the costs of HTO.

  These Australian data on the relationship of the victim's drinking levels to the levels of harm experienced from others are available from the HTO survey for 2010. Special tabulations from the unit record data were undertaken to assist our BCA by the Centre for Alcohol Policy Research (CAPR) (see Appendix F). Our inspection of the tabulations leads to the conclusion that, in simplified terms, persons drinking at Harmful levels are 2.5 times more likely to experience harms from others compared with Non-drinkers and Moderate drinkers; and

- US analysis of the incidence of externalities suggests that higher drinking levels are associated with increased likelihood of experiencing adverse externalities.[53] Greenfield *et al* (2009) report that in the US heavy drinkers are more than seven times more likely to experience adverse impacts than other drinkers. This US study provides separate evidence that drinkers with consumption patterns broadly similar to our definition of Hazardous and Harmful drinkers experience higher levels of externalities.

Reflecting this survey evidence, the changes in harms are scaled across the types of alcohol consumer (including Non-drinkers) for both types of drinking behaviour. We have taken these results and applied an adjustment to the distribution of costs across groups (Table 7). For the base model simulations results, we use the recent Australian data.

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[53]   Greenfield, T K, Ye, Y, Kerr, W, Bond, J, Rehm, Jand Giesbrecht, N (2009) "Externalities from Alcohol Consumption in the 2005 US National Alcohol Survey: Implications for Policy", *International Journal of Environmental Research and Public Health*, Vol 6 No 12, pp. 3205-3224.

Table 7: Who is harmed –Ratio of incidence of harms to others by drinker category

	Australian data	US data
Non-drinker	1.0	1.0
Moderate	1.0	0.9
Hazardous	2.5	1.8
Harmful	2.5	7.3

Note: Assume Non-drinkers provide a base of 1. Moderates are also set to 1.0.

4.9 Conservative approach to estimates

In summary, in this analysis we have endeavoured to use conservative estimates and assumptions wherever possible. Before presenting the simulation results, we outline the key areas of conservatism in our approach to measuring the benefits and costs of changes to alcohol taxes and excises:

- the analysis focusses on direct externalities only, specifically **short-term harms to other people only.** That is, to remove any 'contamination' by costs that could be internalised, we have omitted all self-harms – even if paid by others. In addition, many of these short-term harms have 'long cost tails' – their impacts will be felt by the sufferer for many years. We have not included an estimate of such long-term harms nor harms that are of themselves long term, such as being disabled. Accordingly, we only include HTO costs which were incurred in the year of the study (2009/10) and do not include longer term costs incurred beyond this time (as noted in section 3.3);

- the analysis excludes **indirect externalities arising from the costs imposed on persons other than the drinker as a result of harms to the drinker**. For example, Australia's hospitals are overwhelmingly (in more than 80 per cent) taxpayer funded. More broadly, governments accounted for some 70 per cent of total health expenditure in 2009/10.[54] Access Economics reports that society and employers bore some 51 per cent of the costs of injury and illness in 2005/06.[55] Taken together, these estimates suggest that the proportion of health costs borne by drinkers as a result of their drinking, may be substantially less than 50 per cent of the total. Similarly, through community rating, damage and claims resulting from drinkers are spread to all those with insurance. By definition, the welfare, disability and pension systems are fully taxpayer funded. Thus while health harms and workplace harms from alcohol may fall physically on the drinker, the costs of these harms are borne predominantly by persons other than the drinker. **Nonetheless, the potential reduction in the costs of harms to drinkers paid for by others is excluded from the scope of the study**;

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[54] AIHW (2011) *Health expenditure Australia 2009-10,* Health and welfare expenditure series no. 46. Cat. no. HWE 55. Canberra: AIHW.

[55] Access Economics (2009) *Decision Regulation Impact Statement for a Model Occupational Health and Safety Act*, report for Safe Work Australia, 9 December, p. 5.

- the loss of satisfaction from **reduced long-term drinking** as a result of higher prices is included in the simulation model but any benefits associated with the reduction of HTO – or reduction of any other costs due to reduced long-term drinking – are excluded from this consideration;

- the simulation analysis does not seek to quantify the **benefits of more efficient resource allocation** which would occur as a result of removing the current discriminatory tax treatment for wine which favours production of low value wine and discriminates against high value wine production;

- the simulation analysis does not seek to quantify the **tax system efficiency benefits** available from reforming alcohol taxation and using the proceeds to reduce Australia's least efficient taxes;

- **the cost base for HTO is incomplete**. Our major source of cost data on HTO is Laslett *et al* (2010) with some supplementary information from Collins and Lapsley (2008). However, as noted by Laslett *et al*, this enumeration is not comprehensive and coverage of HTO is incomplete – many sources of harms have not been costed;

- **the Laslett *et al* estimates have been downscoped and downpriced.** For instance, one major category of intangible costs have been simply excluded. In addition, where the cost of time spent or lost caring for drinkers was valued at AWE. As there are arguments that friends and family may not value the time spent caring at their wage rate, we have adopted a very conservative scaling of 10 per cent of AWE;

- there may be **external benefits from drinking.** (See Figure 1, page 13). We have sought evidence on these positive externalities, including socialisation benefits. Note, to qualify as externalities requires that such benefits are not already captured in the willingness-to-pay the market price. Our literature search identifies cases where others have recognised the possibility of such benefits but our search did not identify estimates. As a result, separate estimates of these benefits are not included in the current model;

- there is **contention about whether drinkers consider the risk of future harm to themselves from their drinking**. The base case estimates assume that all drinkers recognise the full cost of their actions, are fully rational and perfectly informed in their consumption decisions. This common assumption is made despite pervasive evidence of preference inconsistency and information failure, and arguments/evidence from modern behavioural economies that decisions may in fact be irrational. However, we do examine the impact of relaxing this assumption.

- we assume that the **self-reported pattern of episodic and average long-term drinking levels are representative** of the pattern of total consumption, i.e., reported and unreported consumption. Note, however, that the World Cancer Fund Report (2007) suggests that survey under-reporting of consumption levels is likely to be greatest where there are elements of embarrassment or illegality in consumption and that as a result, is likely to be greatest for heavy drinkers and for the young. Thus, the extent of bingeing, particularly by persons drinking at Hazardous and Harmful levels, may be understated;

The quantitative impact of the understatement of the level of high-risk drinking can be illustrated by a simple calculation. Assume self-reported consumption is the equivalent of one-half of actual sales data, and assume further that all this under reporting is due to heavy or excessive drinkers. Thus as reported in Table 3, only some 28 per cent is consumed at levels of low risk in terms of long-term and episodic drinking. Therefore some 72/100 is consumed in ways that are potentially harmful. Adjusting for the underreporting may lead to non-safe consumption representing 86 per cent of total consumption;[56];

- we have **included an estimate for the implementation costs** from the policy experiments. These should be tailored to the nature and extent of the policy experiment. However, for both experiments investigated here, we have assumed the cost associated with larger change;

- **dose/response functions are assumed to be linear and strictly proportionate**, i.e., say, a 10 per cent reduction in consumption brings about a 10 per cent reduction in harm. However, many harms appear to respond to levels of consumption geometrically rather than linearly. For instance, Byrnes *et al* (2010) note that the degree of responsiveness of some self harms varies according to volume drunk; and thus also uses an exponential relationship between changes in consumption and non-disease harms (accidents, violence etc). Wherever the dose response relationship is in fact exponential, the proportionate assumption will understate the benefit of reduced harms due to reduced short-term consumption; and

- the **price elasticities used in the modelling are assumed to be lower for abusive consumption** than for Moderate consumption. However, the evidence on this is conflicting. We have not explored the impact of higher price responsiveness for individual beverages for Harmful and Hazardous consumers as suggested by the Sheffield estimates.[57]

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[56]   If non-safe consumption is based on half of actual consumption, then 72 out of 100 is actually 36 out of 50. Further, if all of the under-reporting, i.e., the other 50 per cent, is consumed in non-safe ways, then the 50 per cent is added to both numerator and denominator, That is, 36 out of 50 becomes (36+50) out of (50 +50) or 86 out of 100.

[57]   Albeit for alcohol in aggregate, consumption by Hazardous and Harmful consumers is more inelastic, even under the Sheffield estimates.

5. Benefit cost analysis results

5.1 Policy experiment, scenarios and sensitivities

A wide range of policy experiments and sensitivities were undertaken using the MJA alcohol model to examine the benefits and costs of changes in alcohol taxation. Two policy experiments are reported in detail:

▪ **Policy experiment 1:** The WET is removed and replaced with a volumetric excise equivalent to the rate on full strength draught beer ($29.05 per litre of pure alcohol in 2009/10). All other rates are unchanged; and

▪ **Policy experiment 2:** The WET is removed and replaced with a volumetric excise set at $29.05 per LAL. Excise rates on all other alcoholic beverages are increased by 50 per cent.

In addition, we provide notes on:

▪ **Policy experiment 3:** No change to the WET. All excise rates on other beverages are increased by 50 per cent; and

▪ **Thought experiment:** Minimum price regulation, specifically regulation to increase prices by the equivalent of **Policy experiment 2**.

For the core policy experiments (1 and 2) and all related scenarios and sensitivities analyses, three scenarios regarding the efficiency of decision making on alcohol consumption were examined:

a) consumption by all drinkers is rational and informed;

b) consumption by Harmful drinkers is not rational and informed. The rational and fully informed level for these drinkers is set at the maximum long-term level defined for Moderate drinkers; and

c) consumption by neither Harmful and Hazardous drinkers is rational or informed. The rational and fully informed level for these drinkers is set at the maximum long-term level for Moderate drinkers.[58]

These three scenarios are run for every sensitivity analysis.

As detailed in Appendix H below, the sensitivity of the results is tested for a range of price elasticity estimates; a wider set of HTO benefits as estimated by Laslett *et al* (2010); different assumptions on the response of short-term episodic drinking to changes in overall drinking; and different assumptions on the incidence of HTO across drinker categories.

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[58]   Note that short-term bingeing by Moderate drinkers is never treated by the model as irrational.

5.2 Results for Policy Experiment 1: Wine Equalisation Tax replaced with a $29.05 excise

Policy Experiment 1 removes the WET and replaces it with an excise rate for wine set at the average rate for full strength draught beer, i.e., $29.05 per LAL. The model estimates that the effect of this change on the price of wine is an average increase of almost 17 per cent.[59] Overall, the average price of alcoholic beverages[60] would rise by more than 6 per cent (Table 8).

Table 8: Average price and volume changes for Experiment 1

	Price changes %	Consumption changes %
Beer	0.0	0.0
Wine	16.8	−6.7
Spirits	0.0	0.0
RTDs	0.0	0.0
TOTAL	**6.3**	**−2.5**

Source: Estimates from MJA alcohol economic simulation model.

The effect on consumption is to see a drop in wine consumption. As there are no cross-price elasticity estimates including wine, there is no simulated rise in the consumption of other beverages. Thus, the simulations suggest a fall in overall alcohol consumption of around 2.5 per cent.

Short-term episodic consumption volumes are assumed to fall proportionately. With the cost of HTO also assumed to fall proportionately, the effect of the changes in short-term episodic consumption is to reduce the cost of HTO. These fall by around an estimated $0.33 billion (Table 9). The main source of the reduction in the cost of HTO is the reduction in the loss of quality of life of friends and family who care for drinkers.[61]

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[59]   See discussion on alternative estimates of the magnitude of the price increase in Section 5.9 below.

[60]   Using a base weighted approach.

[61]   Note that this estimate is based on a QALY valued at $53,000. This is around one-third of the authoritative estimates which are of the order of $130,000 to $150,000 in 2007 prices. See Abelson (2008) and Access Economics (2010).

Table 9: Reduction in cost of alcohol harms to others for Experiment 1

Savings in costs from harms to others[1,]	$ million p.a.
Child protection system	20
Effects of drinking on household/family member or friend	
Out of pocket	10
Lost time	20
Loss of quality of life	170
Theft, burglary	0
Counselling, advice & treatment	0
Property damage	40
Loss of life	30
Labour costs on others	20
Costs of hospitalisation of others	0.
Policing & justice system	20
Change from effects on harms	**330**

Note: Estimates rounded to nearest $10m. May not add to Total due to rounding.
Based on costs of harms (Laslett et al) and estimated reduction in volume of high-risk drinking in individual episodes. Cost reduction assumes that harms to others are reduced pro rata with the reduction in the volume of short-term "harmful drinking".

Source: MJA analysis.

As there is only a small reduction in consumption, there is only a small net decline in consumer satisfaction after redistribution of government tax revenues (see first part of Table 10).

Under the conservative assumption that consumption is based on rational informed decisions, the replacement of the WET with a wine excise tax results in a gross loss of consumer surplus of $1.04 billion p.a. However, this is almost entirely offset by higher excise collections (net of annuitised implementation costs). Assuming this additional tax revenue is rebated back to taxpayers, the result is a net loss in consumer surplus of $0.10 billion p.a.

**Table 10: Estimated benefits and costs for Experiment 1 –
Base case, all decisions rational and informed**

	Change in welfare $ billion p.a.
Gross change in Consumer Surplus	−1.04
Rebate of increased taxation	0.94
Implementation costs	..
Net change in welfare	−0.10
Cost savings from reduced collateral harms	0.33
NET BENEFIT per annum	**0.23**

Source: MJA analysis.

Lower consumption of alcohol in total tends to reduce numbers of drinks in episodic drinking which reduces the levels and costs of harms to others as reported above. This saving of $0.33 billion per annum more than offsets the net loss in consumer satisfaction.

The net benefit from the replacement of the WET with a $29.05 per LAL excise is estimated to be of the order of $0.23 billion per year.

Winners and losers – the incidence of benefits and costs

The above results report the aggregate net effect across the total adult population.

Table 11 identifies the major 'winners and losers' by identifying the incidence of benefits and costs across different categories of the adult population.[62, 63] As noted, the effects on harms to others are distributed according to the analysis by CAPR.

In analysing the incidence of benefits and costs across the Australia's adult population, we use the estimates derived from the scenario where all consumption is based on rational and fully informed decisions that is, based on the most conservative estimates of welfare change.

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[62]   Note these results still relate to groups of consumers. Individual consumers will be better or worse off reflecting their own demand, tax situation and extent they would be affected by harms.

[63]   It is important to recall that the term 'rational' as used here is both a convention and assumption. It is unlikely that someone who has had 10 standard drinks is making the same 'rational' decision as before the first drink whether they average above or below two standard drinks per day.

Table 11: Incidence of benefits and costs across Australian adult population for Experiment 1 – Base case, all decisions rational and fully informed

| | Incidence of costs and benefits | | | |
| | Non-drinkers | Moderate | Hazardous | Harmful |
		$ billion p.a.		
Gross change in consumer surplus[1]	0.00	−0.35	−0.35	−0.34
Rebate of increased taxation[2,3]	0.18	0.61	0.11	0.04
Net change in welfare	0.18	0.26	−0.24	−0.30
Cost savings from reduced collateral harms[4]	0.05	0.18	0.07	0.03
NET BENEFIT per annum	**0.24**	**0.44**	**−0.17**	**−0.28**

Notes:
1. *Consumer surplus changes derived from demand equations for each group.*
2. *Net of implementation costs.*
3. *Tax rebates allocated on a per capita basis.*
4. *Harms to others scaled by relative incidence.*

Source: MJA analysis.

Across consumer groups, Moderate drinkers enjoy the largest cost savings from the reduction in harms to others. Moreover, Non-drinkers and Moderate drinkers are likely to be better off when tax increases in revenue are re-distributed, offsetting lost consumer surplus. However, both Hazardous and Harmful drinkers are worse off even after redistributing government revenues.

These effects for Hazardous and Harmful drinkers are only partly offset by reduced harms. As we abstract from the benefits they would gain from their own reduced consumption, both groups remain worse off.

As indicated below, both Harmful and Hazardous drinkers will be less adversely impacted if their drinking decisions are assumed to be irrational or imperfectly informed, albeit still net 'losers'.

If harms are distributed proportionally, both Hazardous and Harmful drinkers are slightly worse off.

Scenarios on rationality, information and the price signal

Under the base case, all decisions on alcohol consumption are assumed to be rational, informed and reflect the full incremental cost of their decisions. An alternative assumption is that at least some drinkers consuming more than recommended by the NHMRC Guidelines are irrational or uninformed when making the decision to consume the extra alcohol. If consumption by, say, Harmful drinkers (and separately Hazardous consumers) is not rational or fully informed then for part of their consumption, the 'actual' consumer satisfaction (benefits) is likely to be lower than perceived.

As noted, we applied the approach used by the Productivity Commission (1999) in its analysis of gambling (See Appendix A below). This approach adjusts the demand curve for irrational consumers toward that of rational consumers. In the current analysis, we have rescaled the demand curves such that consumption is at the maximum level for

long-term consumption in the NHMRC Guidelines. In circumstances where consumption exceeds this average amount, reducing consumption does not reduce consumer satisfaction, but does reduce wasted consumption. This reduced wasted consumption is recorded as a benefit.

Table 12 shows this analysis in the final two columns. In the case of Harmful drinkers, this reduced wasted consumption adds a further $100 million to the net benefits of the introduction of the excise. If consumption by Hazardous drinkers is also deemed to be irrational, a further $160 million is saved.

Table 12: Estimates of benefits and costs for Experiment 1 – Scenarios relaxing rationality assumption

	Assumption regarding consumer groups		
	All rational	Harmful consumption irrational & uninformed	Harmful & Hazardous consumption irrational & uninformed
	$ billion p.a.		
Gross change in Consumer Surplus	−1.04	−0.94	−0.78
Rebate of increased taxation	0.94	0.94	0.94
Net change in welfare	−0.10	0.00	0.16
Cost savings from reduced collateral harms	0.33	0.33	0.33
NET BENEFIT p.a.	**0.23**	**0.33**	**0.49**

Note: Net change in welfare also reflects implementation costs.

Source: MJA analysis.

Overall, this broader analysis suggests the replacement of the WET with a $29.05 per LAL excise would – based on the truncated set of HTO examined only – result in a first round net benefit of between $0.23 billion and $0.49 billion per year. This net benefit would be reduced in the short term due to the disruption to businesses supplying cheap wine previously subsidised by the WET system but would subsequently be increased as resources are re-allocated to higher value activities.

5.3 Results for Policy Experiment 2: Removal of WET and imposition of $29.05 excise on wine, all other alcohol excise increased 50%

Policy Experiment 2 replaces the WET with an excise set at $29.05 per LAL and other alcohol excise rates are increased by 50 per cent. In these cases all other beverages increase in price, the increases ranging from 8 per cent for RTDs to 17 per cent for spirits and wine. Overall, prices increase by 15 per cent (Table 13).

Table 13: Average price and volume changes for Experiment 2 – Base case, all drinkers rational

	Price changes %	Consumption changes %
Beer	13.2	−4.9
Wine	16.8	−6.7
Spirits	16.6	−12.9
RTDs	8.4	−1.3
TOTAL	**14.6**	**−6.3**

Source: MJA analysis.

As a result of these price increases, there are declines in the volume consumed of all beverages. Overall, the volume of alcohol consumed is estimated to fall by over 6 per cent.

The result of these declines in consumption is a decline in harms of the order of $0.82 billion p.a. Again, the major source of benefits is the reduced loss of quality of life (Table 14).

Table 14: Reduction in cost of alcohol harms to others for Experiment 2

Savings in costs from harms to others [1]	$ million p.a.
Child protection system	40
Effects of drinking of household/family member or friend	
Out of pocket	20
Lost time	50
Loss of quality of life	420
Theft, burglary	10
Counselling, advice & treatment	10
Property damage	90
Loss of life	70
Labour costs on others	40
Costs of hospitalisation of others	10
Policing & justice system	60
Change from effects on harms	**820**

Source: MJA analysis.

Note: Estimates rounded to nearest $10m. May not add to Total due to rounding.
1. *Based on costs of harms (Laslett et al) and estimated reduction in volume of high-risk drinking in individual episodes. Cost reduction assumes that harms to others are reduced pro rata with the reduction in the volume of short-term "harmful drinking".*

Table 15 shows the resulting effects on the elements of the BCA.

The gross loss in consumer surplus is again significantly offset by the increase in excise revenues (net of annuitised implementation costs). The net loss of consumer surplus is estimated to be almost $0.6 billion.

Table 15: Estimated benefits and costs for Experiment 2 –Base case, all decisions rational and informed

	Change in welfare $ billion p.a.
Gross change in Consumer Surplus	−3.70
Rebate of increased taxation	3.14
Implementation costs	..
Net change in welfare	−0.57
Cost savings from reduced collateral harms	0.82
NET BENEFIT p.a.	**0.25**

Source: MJA analysis.

Lower consumption of alcohol in total implies lower episodic drinking which reduces the levels and costs of harms to others as reported above. This saving of $0.82 billion p.a. more than offsets the net loss in consumer satisfaction.

The net benefit from the replacement of the WET with a $29.05 per LAL excise and increasing other excise rates by 50 per cent is estimated to be of the order of $0.25 billion per year.

Winners and losers – the incidence of benefits and costs

Looking at the net effects for each consumer group, Moderate drinkers and Hazardous drinkers are the major beneficiaries of the reduction in HTO (see line 4 of Table 16). Moderate drinkers are also the largest beneficiaries of the rebate of increased excise revenues (see line 2 of Table 16). Combining all sources of change estimated, Moderate drinkers and Non-drinkers are the major beneficiaries. However, both Hazardous and Harmful drinkers are worse off both in terms of consumer surplus and redistributed tax revenues and after reductions in harms. Both Harmful and Hazardous drinkers remain worse off under assumption of rationality.

Table 16: Incidence of benefits and costs across Australian adult population for Experiment 2 – Base case, all decisions rational and informed

	Incidence of costs and benefits			
	Non-drinkers	**Moderate**	**Hazardous**	**Harmful**
		$ billion p.a.		
Gross loss of consumer surplus[1]	0.00	−1.24	−1.25	−1.21
Rebate of increased taxation[2,3]	0.61	2.03	0.37	0.13
Net change	0.61	0.79	−0.88	−1.08
Total cost savings from reduced harms to others[4]	0.13	0.44	0.18	0.06
Total net benefit	**0.74**	**1.22**	**−0.70**	**−1.02**

Notes:
1. *Consumer surplus changes derived from demand equations for each group.*
2. *Net of implementation costs.*
3. *Tax rebates allocated on a per capita basis.*
4. *Harms to others (generally) scaled by relative incidence.*

Source: MJA analysis.

Note that the Harberger assumption that the increased excise revenue is returned to consumers via a lump sum per capita rebate for all taxpayers appears to dominate the numeric estimates of net benefit across the consumer categories. A relevant question therefore is whether the qualitative conclusions about the relative net benefits to Moderate drinkers and others are similarly dependent on this assumption? All consumers, whether drinkers or not, benefit from reduction in HTO, with Moderate drinkers gaining over 50 per cent of these benefits, and Non-drinkers gaining over 15 per cent. Compared with their relatively small population (around 15 per cent), Hazardous

and Harmful drinkers gain a large proportion (almost 30 per cent) of the total benefit of reduced HTO – because they are more likely to be victims than are Non-drinkers or Moderates.

Also, as already indicated, under any reasonable distribution of the increased excise revenue, Non-drinkers and Moderates are likely to benefit more.

Consequently, the relative figures for each consumer group are not an artefact of a peculiar assumption about how the increase in excise revenue might be returned to taxpayers or others. Thus, the answer to the above question, appears to be no, the qualitative rankings on net benefits across consumer groups appear to be reasonably robust. We suggest that:

- Non-drinkers will be net beneficiaries no matter how the rebate or reduction in other taxes occurs;

- Moderate drinkers enjoy the largest reduction in the costs of the HTO and would appear to retain their preferred status under any reasonable method of rebate or reduction in other taxes;

- Hazardous drinkers are net losers under most assumptions. However, under Experiment 1 they may be little affected overall assuming part of their consumption is irrational; and

- Harmful drinkers appear to be net losers under any reasonable system of rebate or correction in other tax rates. However, Hazardous and Harmful drinkers can be expected to enjoy the largest (but unquantified in this study) improvements in their physical health and in absenteeism and workplace productivity.

Scenarios on rationality, information and the price signal

As with Policy Experiment 1, under the base case, all decisions on alcohol consumption are assumed to be rational, informed and reflect the full incremental cost of their decisions. An alternative assumption is that at least some drinkers consuming more than recommended under the NHMRC Guidelines are irrational or uninformed when making the decision to consume the extra alcohol. If consumption by, say, Harmful drinkers (and separately Hazardous drinkers) is not rational or fully informed then for part of their consumption, the 'actual' consumer satisfaction (benefits) are likely to be below what the drinker paid for the alcohol.

Table 17 reports the effect of relaxing the assumption on rationality. The first column provides the base case for comparison. Where consumption decisions by Harmful drinkers are not assumed to rational and fully informed, then reducing this 'wasted' consumption improves society's welfare: the gross loss of surplus is reduced by $0.32 billion and the net benefit estimate rises to $0.57 billion per annum. If drinking decisions by Hazardous drinkers were also deemed to be irrational or uninformed, the net benefit would increase to $1.22 billion per annum.

Table 17: Estimates of benefits and costs for Experiment 2 – Scenarios relaxing rationality assumption

Effect of policy	Assumption regarding rationality and information		
	All rational	Irrational & uninformed	
		Harmful only	Both Harmful & Hazardous
		$ billion p.a.	
Gross change in Consumer Surplus	−3.70	−3.38	−2.85
Rebate of increased taxation	3.14	3.13	3.13
Net change in welfare	−0.57	−0.25	0.28
Cost savings from reduced collateral harms	0.82	0.82	0.82
NET BENEFIT p.a.	**0.25**	**0.57**	**1.10**

Note: Net change in welfare also reflects implementation costs.

Source: MJA analysis.

Overall, this broader analysis suggests the replacement of the WET with a $29.05 per LAL excise and increasing other excise rates by 50 per cent would result in a first round net benefit of between $0.25 billion and $1.10 billion per year.

5.4 Results for Policy Experiment 3: WET retained, excise rates increased by 50%

Comparison of the simulation results for the two policy experiments reported above, that is:

a) replacing the WET with an alcohol excise rate of $29.05; and

b) then adding 50 per cent to all other excise rates

suggests that – as measured – the net benefit of increasing excise rates on beverages other than wine is relatively small when all drinking decisions are assumed to be rational and informed. This inference is confirmed by direct simulation of the model.

The explanation includes that:

▪ the increase in wine taxation more than doubles the effective average tax rate. This compares with a 50 per cent increase in excise rates on the other beverages only, i.e., the additional price change in the Policy Experiment 2 (compared with Policy Experiment 1) is proportionally much smaller;

▪ the combination of a) already high excise rates and b) the 'fact' that spirits are significantly more price elastic than wine means that increasing the excise rate and prices on spirits and RTDs causes a proportionately larger net loss of consumer surplus than occurs for the price inelastic (and lower taxed) beverages, i.e., wine and beer; and

- the lack of cross price elasticities between wine and other alcoholic beverages. The lack of cross price elasticity means that the reduction in alcohol consumption, and therefore in HTO, as a result of Experiment 1 (i.e., abolishing the WET and replacing it with an excise of $29.05 per LAL), is overstated. In Experiment 2, the prices of other beverages are also increased so that the omission of cross price effects is less material and the extent of the over-statement is less.

The result is that the benefits (from the reduction in the selected HTO) attributable to the increased price of spirits and RTDs, are estimated to be insufficient to offset the proportionately large net loss of consumer surplus. If the impacts on drinkers of their own behaviour are excluded, the tempting, but likely flawed, conclusion is that a 50 per cent increase in the excise rates on spirits and RTDs would not improve the welfare of the Australian community. This conclusion is, however, obviously dependent on the magnitude of the resulting benefits and thus the size of the cost base(s) considered in the study. This cost base includes the cost of HTO and – if there is any irrationality or imperfect information in drinking decisions – costs that are unmatched by benefits.

Where perfect rationality and information is assumed, the analysis suggests that for the benefits of an excise increase on spirits and RTDs to equate to the costs would require that gross benefits be around 20 to 25 per cent larger than currently estimated.

As noted we have deliberately excluded a wide range of potential harms and therefore potential cost reductions.[64]

A fuller accounting of potential cost reductions would increase benefits and as suggested by Table 19 (and the related discussion in Chapter 6) by much more than the 20 to 25 per cent increase required for the benefits of increasing spirit and RTD excise rates by 50 per cent to exceed the costs.[65] In addition, any decision to exempt spirits and RTDs would require careful consideration of substitution effects, and therefore cross-price elasticities.

In addition, the apparently small benefits attributed to increasing existing volumetric excise rates only is very much a result of the conservative assumption of complete rationality and perfect information in drinking decisions.

If it is assumed that some drinking decisions were irrational or uninformed, then the proportionately larger reduction in consumption, due to higher price elasticities for spirits and RTDs, generates a greater reduction in unmatched costs. (Compare the Net Benefit estimates across the columns in Table 12 with those in Table 17.)

Thus, the tempting interim conclusion that a 50 per cent increase in excise rates for spirits and RTDs is not justified on benefit cost grounds should be seen as no more than that, i.e., tempting but interim and only applicable under the limiting assumptions and scope adopted in the model.

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[64] Specifically, we have excluded around half (of our inflation adjusted estimate) of the total cost of all HTO measured by Laslett *et al* and we have ignored the unquantified but likely substantial costs of health harms to drinkers paid for by others and the unquantified costs of absenteeism and lowered productivity associated with drinkers themselves.

[65] The logic of the indicative, fuller accounting of benefits and costs shown in Table 20 is directly applicable here.

5.5   Thought experiment: minimum price regulation

Rather than raise the price of alcohol by increasing excise tax rates, considerable attention has been devoted in Scotland, England and Wales to minimum price regulation. The detailed analyses undertaken by the Sheffield team and others demonstrate that such a policy would be highly effective in reducing the level of harms to both drinkers and non-drinkers. However, the option of minimum price regulation does not, to date, appear to have been subject to BCA.

The likely benefits and costs of imposing minimum price regulations on alcohol in Australia can be demonstrated by a simple thought experiment. Assume that instead of raising prices by increasing excise tax rates, that the same price increases were achieved by price regulation. Thus:

- the cost of the gross loss of consumer surplus is the same in both cases, as are the benefits of the reduction in the cost of harms;

- the critical difference is that minimum price regulation provides no increase in tax revenue with the result that there is no rebate of the increased tax revenue and thus no offset to the gross loss of consumer surplus for most consumers; and

- in contrast to excise tax options, minimum price regulation creates and legitimises super profits/monopoly rents for alcohol suppliers. The resulting super profits/monopoly rents are of the same magnitude as the increase in tax revenue that would occur under the option of a (discriminatory) increase in excise rates.

Consequently,

- whereas raising beverage prices by increasing tax rates and tax revenue provides a mechanism to offset (for all taxpayers) the loss of consumer surplus from reduced consumption, this cannot occur for most consumers when prices are raised by minimum price regulation;

- compared with the option of increasing tax rates on alcohol, the option of raising minimum prices is highly regressive. The super profits created by minimum price regulation will flow overwhelmingly to parties in the alcohol supply chain holding market power, i.e., the major retailers, and thus to their Australian and foreign shareholders. Although many Australians hold shares through their superannuation funds, both superannuation fund balances and direct shareholdings are held disproportionately by individuals at the very top of the income distribution;[66]

- when compared with the option of increasing excise tax rates, national income would be lowered since a substantial part of the super profits created by the price regulation would flow to the overseas shareholders of the alcohol supply chain;

- for the vast majority of the Australian adult population, minimum price regulation will achieve a net benefit only if the benefits from reduced harms exceed the gross (as distinct from the net) loss of consumer satisfaction /surplus (since for them there is no offsetting tax effect). For the vast majority of the population, for the benefits of price regulation to exceed the costs requires that the benefits of

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[66]   Other parts of the alcohol supply industry – such as small growers of low-value wine – may receive little or no part of the super-profits created.

(minimum) price regulation be a significant multiple of the benefits of increased taxation; and

- the fact that States have the constitutional power for retail price regulation suggests significantly higher administrative costs across governments to achieve minimum price regulation nationally.

It is a difficult proposition to argue that providing super profits to alcohol retailers represents a welfare improvement for Australian society.

The thought experiment demonstrates that economically it is difficult to justify a minimum price over a volumetric tax rate. However other reasons for implementing a minimum price need to be explored before disregarding this policy option.

5.6   Sensitivity analyses

MJA undertook a wide range of sensitivity analyses to test the estimates. As noted previously, the assumptions employed in the model are intended to be conservative. Consequently, the sensitivity analyses examined tend to make a stronger case for alcohol taxation reform. A fuller discussion of the sensitivity analyses undertaken in provided in Appendix H.

6. Conclusions and discussion

6.1 Main conclusions

The main conclusions from the quantitative analysis presented in this study are as follows:

- for the Australian community as a whole, the benefits of reforming and increasing alcohol taxation are estimated to exceed the costs by a significant margin. Potential reductions in the cost of collateral harms caused by the drinking of others are estimated to be sufficiently large alone to offset the net loss of consumer satisfaction and the costs of implementing the changes in tax rates;

- Moderate drinkers (almost two-thirds of the adult population) are clearly beneficiaries of the modelled alcohol taxation reform scenarios. Their loss of enjoyment which results from higher prices and reduced consumption of alcohol, is more than offset by:

    – significant cost savings from reduced levels of harms caused by the binge drinking of others. Moderate drinkers account for the largest portion of the benefits of reduced HTO. Hazardous drinkers also benefit substantially from the reduction in HTO;

    – Moderate drinkers – and Non-drinkers – are also major beneficiaries from any reasonable method of rebating the increased alcohol excise revenue back to taxpayers or the community, resulting in increased disposable income.

    For Moderates – and Non-drinkers – these two sources of benefit swamp the estimated costs (loss of enjoyment) from reduced consumption of alcohol;

- Non-drinkers are also unequivocally beneficiaries; and

- under very conservative assumptions, net benefits from the reductions in HTO alone are around $230 million per year when the WET is replaced and other excise rates are increased by 50 per cent. Under more realistic assumptions, which acknowledge that Harmful drinking is either uninformed or irrational, net benefits are estimated to exceed $570 million annually. Thus, admission that drinking decisions are not wholly rational or informed has a material additional impact in increasing the magnitude of the net benefits and the strength of the case for taxation reform.

In summary, the focus of the general public's concerns over alcohol, i.e., the harms they suffer from the drinking of others are – when evaluated on economic terms – more than sufficient to warrant action to end the WET anomaly and to raise excise rates.

These are strong and clear results. Indeed this application of BCA to alcohol tax reform provides a strong, new, detailed and separate case for alcohol tax reform in Australia:

- the strength and robustness of the results arise because first, all costs have been accounted for and only part of the potential benefits have been quantified. Despite examining one subset of benefits only (HTO), the magnitude of the enumerated benefits comfortably exceeds the fully enumerated cost of alcohol tax reform.

Moreover, where there is no authoritative estimate or approach for key parameters, we have deliberately chosen the more conservative estimate or approach. And further, the base case estimates assume that all drinking decisions are rational and fully informed and reflect the full incremental costs of the decisions – which clearly is not the case;

- it is a new and detailed case because HTO have not previously been the focus of a detailed public policy simulation study; and

- it is separate and independent because the net benefits gained from reducing HTO are sufficient in themselves to justify alcohol tax reform. An economic case for alcohol tax reform can be made on the basis of reduced HTO alone without reliance on the several other sources of benefit which would be potentially activated.

  Although excluded from the current study, these sources of potential benefit would be incrementally positive and possibly separate standalone cases for alcohol tax reform in Australia.

There are also broader conclusions and implications for methodology and future assessments and communication:

- from a methodological perspective, transferring the debate on alcohol policy from the arena of health policy to the economic framework of BCA strengthens – rather than weakens – the case for policies to reduce alcohol harms through increased prices via higher taxation.

  Recognition of consumer benefits is methodologically (and politically) essential – but is found to be immaterial in the case of alcohol taxation reform. It does not change the emerging public policy recommendations or their importance. On the other hand, the recognition of consumer benefits is actually very important as it shows the high cost associated with some other options such as banning alcohol;

- the ability to reduce HTO through tax changes has been illustrated here. This is important given that the Australian public appear more concerned about the potential for excessive drinkers to cause harms and costs to themselves and others than they are about the costs of health harms as a result of their own or others drinking;

- health advocates have focussed on the health benefits of reducing alcohol consumption. In contrast, much of the previous economic argument in policy discussion has focussed on the gross costs to consumers, particularly to Moderate drinkers. In both the Australian and UK debate, there has been essentially no recent attempt to integrate or compare the benefits and costs. Yet such integration is essential for rational policy formation and evaluation; and

- the framework and discipline of developing a model to simulate the welfare impacts of changing policy parameters identifies gaps and new priorities for future alcohol research and economic investigations.

This first evaluation of the benefits and costs of reforming and increasing alcohol taxation suggests that the tax instrument is indeed highly effective and efficient. It does not demonstrate that increasing taxation is the only or best instrument to achieve a reduction

in harms. This study has not sought to compare the merits of alcohol taxation reform *vis-a-vis* other potential policy changes to reduce alcohol harms.

However, we note that excise tax (structure and rates) is a policy instrument which is immediately available, for the Commonwealth Government alone, and an instrument which has been repeatedly identified as unequivocally pervasively effective. Other policy relevant instruments to reduce HTO are primarily for state and local governments and are unlikely to be implemented quickly or on a comprehensive basis.

In a perfect world, all available policy options should be carefully evaluated and ranked or combined in a portfolio of measures. This strive for perfection, however, should not preclude effective action now to reduce the harms from alcohol, particularly the HTO.

Since the marginal costs of alcohol to others appear to exceed the average costs, regulatory interventions such as reduced opening hours, especially in high risk locations and times, are *prima facie*, highly attractive. However, excise tax increases appear to complement these other forms of intervention. Indeed, the pervasive extent of alcohol in Australian society and the multiple sources and types of harms suggest that a multi-instrument and sequenced approach is required. Excise tax (structure and rates) should be the core and first instrument employed to gain the substantial net benefits available. [67] This conclusion is reinforced when the scope to improve the efficiency of Australia's tax system and the efficiency of resource allocation are added to the argument.

6.2   Towards a broader, comprehensive framework

The very limited scope of the benefits from alcohol tax reform canvassed in our BCA simulations needs to be stressed. The model simulations have not explored the full range of potential benefits of reforming and increasing alcohol excises. The full range includes:

▪ **tax efficiency**: All taxes, other than lump sum taxes, involve a deadweight burden by discouraging effort. The alcohol excise is highly efficient when compared with the deadweight burdens of income taxes and other taxes particularly state taxes. This is so because first, the demand for alcohol is inelastic and second, it taxes an activity or good which has negative externalities. Table 18 shows recent estimates of the marginal and average deadweight burdens for alcohol and other taxes. We have added additional columns to show a) the difference in the marginal burdens and b) the revenue amounts raised by the States in 2009/10. Alcohol excise has a low marginal and average excess burden on consumer welfare. That is, increasing taxation of these products will have less impact on overall welfare than increasing most other taxes. Most of the taxes likely to be reduced as a result of reduced harms have a much higher burden (see again Table 21).

Since the additional revenue raised by ending the WET and raising other excise rates by 50 per cent is in excess of $3 billion, there is a potentially large tax efficiency gain if, instead of rebating the increased alcohol excise revenue on a per capita basis per taxpayer, less efficient taxes can be reduced. By increasing alcohol

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67   If other policy instruments were found in the future to be more effective and preferred, then following the successful introduction of these other measures, excise taxes on alcohol could be subsequently reduced.

taxation, an additional deadweight burden is imposed, but using the receipts to reduce less efficient taxes removes an even bigger burden.

This would not change the estimate of the net loss of consumer surplus for all persons in total. Noting, that switching from a lump sum per capita rebate to a reduction in the rates of less efficient taxes, may, however, after the distribution of the changes in net surplus across drinker categories.

How reduced costs will affect the sources of state government financing can vary but the efficiency gains will be larger if states were able to reduce their least efficient taxes.

Table 18: Excess burden from alcohol and State taxation

	Revenue raised 2009/10	Marginal Excess Burden[1]	Average Excess Burden[2]	Additional Marginal Burden Compared with Alcohol Excise
	($ b)	(cents of consumer welfare per dollar of taxation revenue)		
Land taxes	7.0	8	6	−1
Alcohol excise and WET		**9**	**7**	**–**
Stamp duties (except real property)	13.2	18	18	9
Conveyancing stamp duties		34	31	25
Motor vehicle registration	7.0	37	32	28
Motor vehicle stamp duty		38	38	29
Payroll tax	16.8	41	22	32
Insurance taxes	4.6	67	47	58
Gambling taxes	5.1	92	54	83

Source: KPMG (2010) The Excess Burden of Australian Taxation, report for Department of the Treasury

Notes:

1. *The marginal excess burden is the effect of a small change in the tax on consumer welfare (negative represents improved welfare).*

2. *The average excess burden is the average effect of the whole tax on consumer welfare (negative represents improved welfare).*

- **resource allocation efficiency:** The WET provides low-value wine growing and processing with a substantial tax subsidy, the equivalent of substantial industry assistance. Not only does the low effective tax on cheap wine boost sales, but it also draws capital, labour, water and other resources into the production of cheap wine and away from other more productive activities and uses.[68] All the costs of distorted allocation of capital, labour, water and other resources and all the arguments for reducing high levels of industry assistance which led to the

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68 *"To understand inland water usage, up to 1000 litres of river water are required to produce one litre of wine that sells for less money than one litre of bottled water in the UK or the USA."* http://drinkster.blogspot.com.au/2011/09/dudley-brown-clears-water.html

dismantling of Australia's tariff walls from the 1970s onwards apply to the WET. Similarly, the counterpart arguments, issues and potential responses to the disruption of businesses and communities in the short term also apply. Neither the short-term costs nor the longer term resource allocation benefits of ending this anomaly in alcohol taxation (and therefore the anomaly in industry assistance) have been quantified in this study.

- **externalities:** Collateral harms to others have been evaluated in the benefit cost framework applied to this study. However, this study has evaluated only around half of the total costs of these direct externalities as estimated by Laslett *et al*. We have excluded a substantial part of these costs by our decision to exclude many of the intangible costs. Note also that the Laslett *et al* costings were in themselves not exhaustive.

  However, as noted, there is an important missing category – indirect externalities – which has not been included. Specifically, we have excluded the cost of harms to drinkers which are paid for by others.

  Australian society (like the societies of New Zealand, Canada and Europe) provides universal health insurance and welfare safety net support and a substantial portion of these costs are paid for from general tax receipts. Moreover, health insurance premiums are based on community rating so healthier individuals subsidise the costs of those with alcohol-related poor health.

  For instance, as already noted, payments by individuals, their insurers and private donations and bequests totalled no more than 18 per cent of the total $40 billion to run Australia's public and private hospitals in 2007/08. All other things being equal, persons suffering health harms as a result of their drinking will pay on average no more than 18 per cent of their hospital costs. Furthermore, Australia's welfare and medical insurance systems act to underwrite and further subsidise the cost of harms incurred by drinkers.

  There is a clear unambiguous efficiency cost to the imposition of these indirect externalities:

  – on government budgets: to maintain budget balances, governments have to increase taxes to cover the additional expenses and all taxes have an efficiency cost; and

  – on individuals to expend their own resources to treat and mitigate the health harms incurred by drinkers.

  From the perspective of all members of society the payment by others of costs incurred as a result of harms to the drinker, might be seen as simply a transfer. However, much of Australian society now places great emphasis and attention on the size of government expenditures and on the budget balance. Thus, the benefits and costs of alcohol to the general tax payer should arguably be given greater standing – or at least separate standing and reporting – in benefit cost evaluations of this type. In that case, the full range of costs imposed by drinkers on others through the tax and welfare systems should be identified and accounted for.

  Non-and Moderate drinkers will, in particular, benefit financially from reduced health harms to Hazardous and Harmful drinkers. This is so, for instance, because

Moderate and Non-drinkers pay major proportions of total bills for tax and for insurance premiums. These subsidies for the costs of high risk drinking encourage higher levels of consumption and harms.

- **correction of irrationality, information failure and subsidised costs:** In this study we have evaluated the impact of different assumptions regarding irrationality and information failure. The weight of evidence (on long-term drinking pattern, the change in preferences with age, and the impact of short-run intoxication on drinking levels, together with the rapidly changing information on the costs and risks of both longer term and short-run drinking), suggests that it is implausible to assume that all drinking decisions are fully rational and fully informed. In addition, pervasive subsidies mean that drinkers do not face the full incremental costs of their decisions.

Table 19: Indicative full scope – Analysis of economic welfare benefits and costs of alcohol excise changes for Australian society in total and Non-and Moderate-drinkers; 2009/10

Costs from policy change[1]	Total Society $b p.a.	Non and Moderate-Drinkers $b p.a.
Gross change of consumer surplus	−3.70	−1.24
Less rebate of increased excise revenue	+3.13	+2.65
Less Implementation costs	..	..
Net change of consumer surplus	−0.57	+1.41
Benefits		
Tax efficiency		
Efficiency gain: from reduction in deadweight loss by offsetting inefficient taxes using increased excise receipts[2]	0.31	0.27[8]
Efficiency gain: from further reduction in deadweight loss from lowered need for public funding due to reduced harms[3]	n.q.	n.q.
Correction of externalities		
Direct: Collateral harms to others	0.82	0.69
Indirect : reduced harms to drinkers paid by others		
– Welfare system cross-subsidies	–	n.q.
– Efficiency cost of insurance system[4]	n.q.	n.q.
– Insurance cross-subsidies[5]	–	n.q.
Reduction in workplace harms & productivity loss	n.q.	n.q.
Correction of irrationality & information failure[6]		
Reduction in unmatched costs	0.32	0
Reduction in costs of harms to drinkers, paid by drinkers	n.q.	n.q.
GROSS (QUANTIFIED) WELFARE BENEFITS	1.45	0.96
NET (QUANTIFIED) WELFARE BENEFITS	+0.88	+2.37
Resource allocation efficiency		
Net efficiency gain after disruption costs[7]	n.q.	n.q.

n.q. = not quantified

See Notes on next page.

Notes to Table 19:

1. *Policy change is abolition of the WET, setting wine excise rate at $29.05, plus a 50 per cent increase in other alcohol excise rates;*

2. *Rather than a lump sum rebate per capita, we assume here that a reduction in tax weight affects each drinker category proportionately. Since the return of the increase excise revenue to consumers occurs through changes in lowered tax rates, there is a reduction in the deadweight burden of the Australian tax system. Inspection of the Econtech analysis and submission to the Henry Tax Review (see Table 18) suggests that a 10 percentage point reduction in burden is conservative;*

   For instance, applying the increase in excise revenue of $3,140 million to reduce State payroll taxes would reduce tax burden by around 30 percentage points giving an efficiency gain $940 million – i.e., a benefit of the same magnitude as the gains from reducing HTO;

3. *Most of the public expenditure saved by a reduction in HTO from short-term episodic drinking, i.e., bingeing, appears to be State rather than Commonwealth. State taxes are particularly inefficient in terms of the level of deadweight burden (see Table 18).*

4. *The insurance system has a deadweight administrative cost. Estimates are available from Laslett et al;*

5. *Health insurance premiums do not in general distinguish between non-drinkers and/or different categories of drinkers. Motor vehicle insurance is voided if the insured driver in an accident is found to exceed nominated blood alcohol content levels. Since the several relevant insurance premiums essentially reflect community rating rather than individual risk rating, there are substantial cross-subsidies from low-risk individuals to high-risk individuals;*

6. *Assumes consumption by Harmful drinkers only is irrational. Following Productivity Commission (1999) framework, the demand curve for Harmful drinkers is corrected back to the demand curve for Moderate drinkers; and*

7. *The subsidy provided by the WET to wine in general is significant and reflecting the value basis of the tax, the subsidy is much greater for cheap wine than it is for more expensive wines. As with other forms of industry assistance, the equalisation of rates of subsidy achieved by abolishing the WET and moving to a more uniform of volumetric rates should be expected to result in significant efficiency gains through better resource allocation;*

8. *Assumes inefficient taxes are paid by different consumer groups in proportion to the size of those groups.*

A fuller accounting of the benefits and costs of abolishing the WET and increasing alcohol excise rates is therefore sketched in Table 19. Pertinent insights from this sketch are that:

- our simulation analysis only evaluates three of some ten potential categories. The omitted categories provide an agenda for investigations (see Appendix A);

- the benefits of reducing the costs associated with alcohol are only one part of the story. Alcohol taxation reform offers major gains in (a) tax efficiency since increased excise revenue can be used to reduce less efficient taxes and (b) the efficiency of resource allocation; and

- there are very large benefits available to the majority of the Australian population from alcohol taxation reform. Alternatively expressed, the current system of alcohol taxation imposes multi-billion dollar costs on Non-drinkers and Moderate drinkers who together comprise 85 per cent of adult population.

The collective set of findings from this study have relevance beyond Australia. Although calibrated to Australia, our analytical framework, modelling and simulations suggest that the similar qualitative findings will apply in the UK and other economies with similar drinking patterns and strong bingeing cultures among drinkers.

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Appendix A.   Benefit cost analysis and the treatment of consumer surplus under differing assumptions on rationality and information

BCAs are routinely required to provide a measure of the impact of changes in policies and programs on identified groups or society as a whole.

Conceptual underpinnings

BCA begins with the concept of consumer sovereignty and examines how a policy proposal or project will change the benefits and costs for the aggregate of relevant persons or entity (i.e., persons with standing). The Pareto criteria that a proposal or project should not proceed unless at least one person is better off and no-one is worse off is made workable by employing the concept of hypothetical compensation. This treats a dollar in the hands of one individual as equally valuable to dollars in the hands of all other individuals. Further, there is no reduction in utility as individuals gain more and more dollars. Welfare (or utility) is measured by willingness-to-pay. Willingness-to-pay is not merely a method of valuing benefits; it is the fundamental rationale.

BCA requires that the benefits and cost of alcohol taxation reform are measured consistently in terms of what matters to Australians, i.e., the opportunity costs of what they might lose and their willingness-to-pay for potential benefits, such as improved quality of life. Other non-material things matter to people. Where there are perfectly formed markets, opportunity cost and willingness-to-pay are reflected in market prices. However, where markets are imperfectly formed due to significant externalities or other forms of market failure, market prices may not be observable and/or will not reflect opportunity cost or willingness-to-pay for society as a whole. Consequently, non-market valuations must be employed.

Valuation of benefits and costs using non-market prices is valid and required in order to examine public policy impacts on society's welfare. However, such valuations should not be compared with economic and financial aggregates based on market prices such as GDP or company turnover.

Consumer satisfaction is measured by consumer surplus. The role and integrity of consumer surplus in measuring the private benefits of alcohol consumption is less straight forward than in the case of ordinary goods. These issues are discussed in Appendix A.

In addition, firms may generate surplus (producer surplus) which represents 'excess' profits or those above a 'normal' rate of return. For the purposes of this analysis, we have assumed that alcohol is a competitive market and that excess returns are limited by ease of entry.[i]

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[i]   This means that firms expect returns on their investment commensurate with the risk of the activity.

Standing: from whose point of view?

An important issue in public policy and BCA is the question of who has standing. Should the BCA analysis evaluate the benefits and costs from the perspective of:

- all members of society including Australian nationals overseas;

- all members of society including or excluding criminal activity; and

- all taxpayers; and so on?

Questions of standing are particularly important for alcohol: a wide range of harms impacting the drinker are not paid for by the drinker. Similarly, although mitigated by subsequent inter-government transfers, the Commonwealth receives tax and excise revenue but the costs imposed by alcohol on governments at least initially fall mainly on the states, and therefore their taxpayers.

A general issue in the wider debate on the benefits and costs of alcohol – and hence the net benefits of any policy response – is the concern among economists that the benefits of consumer satisfaction have not, to date, been taken into account. Given the typical reliance on the assumption of consumer sovereignty in economic analysis, this is a valid criticism and needs to be addressed squarely.

Relevant questions relating to consumer surplus, its definition and estimation include:

- how is consumer surplus defined and how does an increase in the excise tax cause a loss of consumer surplus?

- what is the definition and integrity of the concept of consumer sovereignty which underpins the definition of consumer surplus?; and

- how should the concepts of consumer sovereignty and consumer surplus be (re-)defined and applied for extra-ordinary goods such as gambling and alcohol?

Definition of consumer surplus

On the first question, consumer surplus is defined as the difference between the value at which a consumer (or the sum of consumers) values his/her consumption and the price he/she paid for the consumption. Typically, consumers will be willing to pay less for extra amounts of a product.[ii]

Thinking about the demand curve for a product (Figure A.1), this value is represented by the area between the demand curve (D) and the horizontal line representing the price paid by (all) consumers (P_0).

[ii] So if she is willing to pay $10 for the first drink, a consumer may only be willing to pay $8 for the second, $5 for the third and so on. Putting all these intents together, if a drink costs $5, she will purchase her first drink and be better off by $5; she will purchase her second drink and be better off by $3. For her third drink, she receives as much value as she is willing to pay. If (as) for her next drink she is willing to pay less than $5, she will not purchase it. For this consumer, her consumer surplus is $8 ($5 + $3). We do this across all consumers to estimate the overall benefit from purchasing alcohol.

Figure A.1: Consumer surplus is the excess of willingness to pay over price
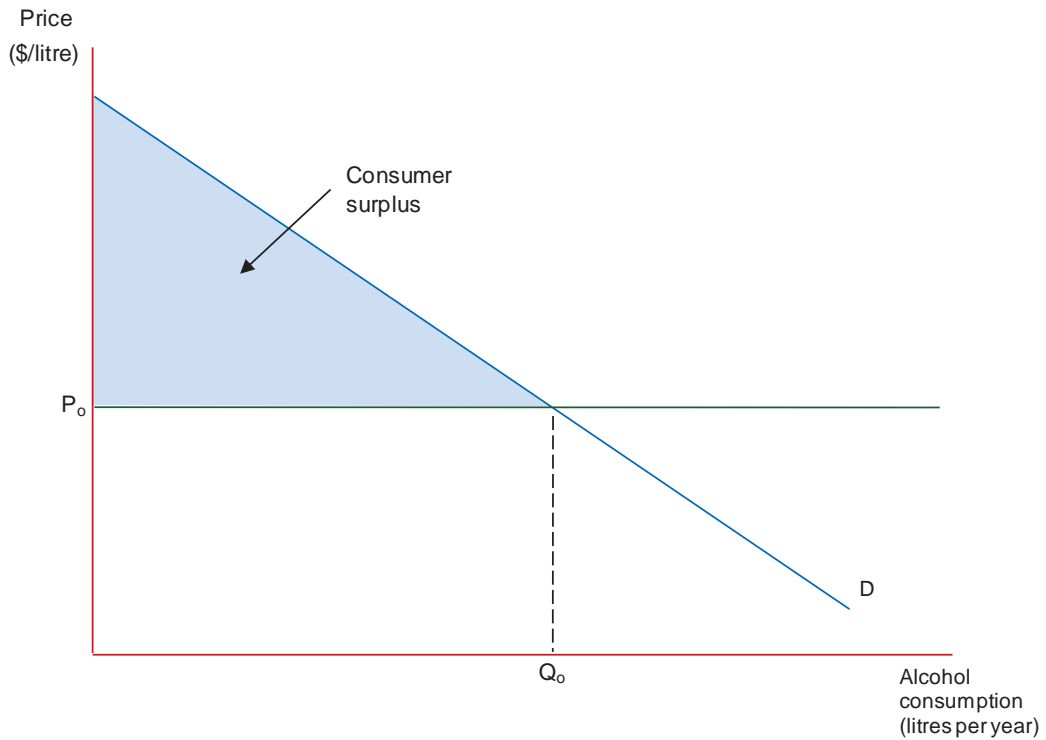
Policy measures that affect the demand for goods will impact on consumer surplus, and hence changes in consumer surplus are important criteria by which to assess policies. For example, a tax on a product will reduce consumer surplus, as the gap between what consumers are willing to pay and the price (after tax) is reduced (Figure A.2).

Typically, the bulk of the loss in consumer surplus is transferred to the government in the form of taxation revenue (area b), but some part of the consumer surplus disappears altogether. This is because the price rise as a result of the tax leads to a fall in consumption of the product, eliminating the consumer surplus that accrued over that range (area a). Note that the surplus captured by government is not lost – just transferred.

Figure A.2: A tax imposition reduces consumer surplus

Price
($/litre)

$P_o + T$

T

b

a

P_o

T

D

Q_1 Q_o

Alcohol
consumption
(litres per year)

a: deadweight loss from tax
b: transfer to government in
   form of alcohol tax revenue
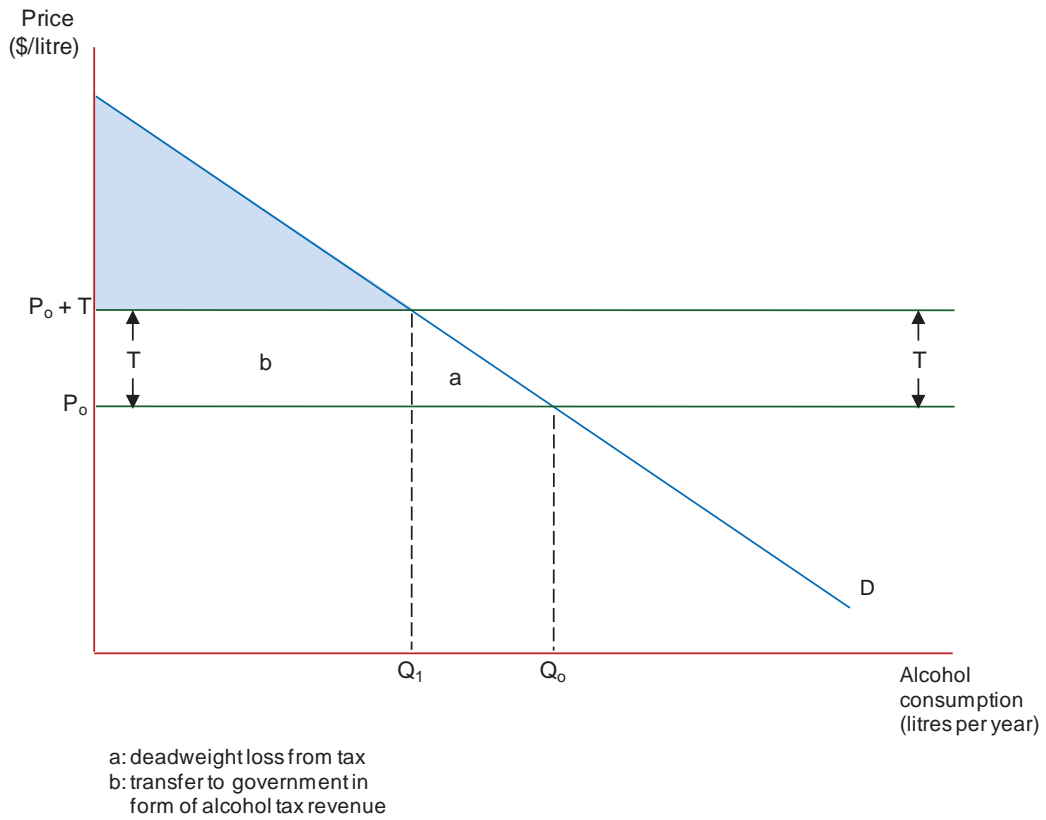
Where a tax is already imposed (and therefore the government is capturing some of the consumer surplus –'b' in Figure A.2), the increase in tax reduces this captured surplus as well (Figure A.3). The net benefit in this case is the gross loss in consumer surplus –(a + b) plus the transfer to government +(b – c). The net change is therefore –(a + c).

Figure A.3: Increase in a tax reduces consumer surplus and the surplus captured by government

a: deadweight loss from tax
b: transfer to government in
   form of alcohol tax revenue
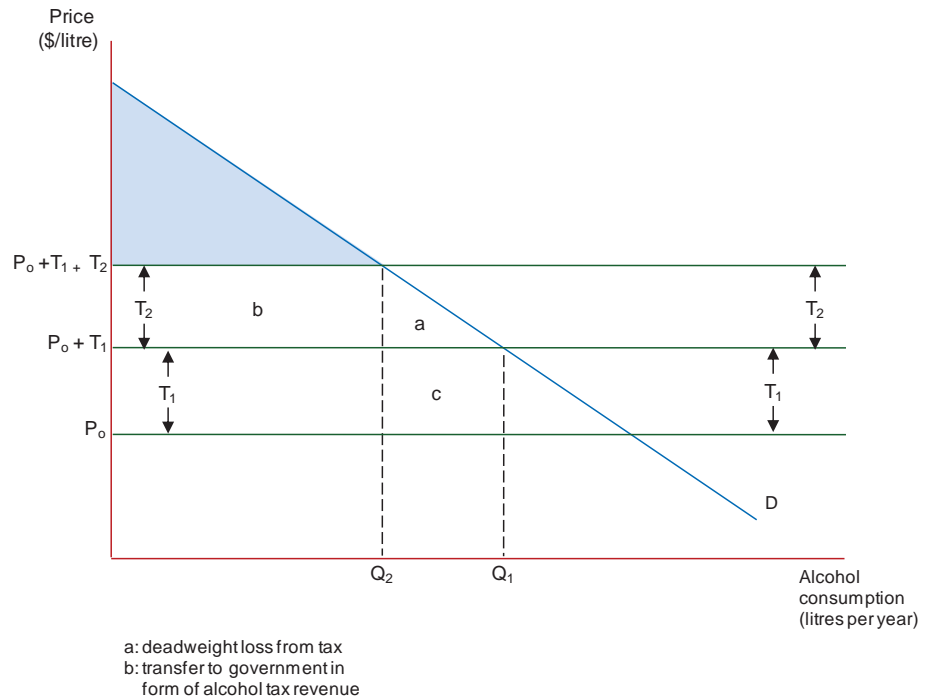
Integrity of the concept of consumer surplus

On the question of the integrity of the concept of consumer sovereignty, strong and divergent views are frequently taken. For example, in the recent debate in New Zealand, Crampton and Burgess state:

> *BERL is too quick to dismiss rational explanations for heavy and addictive use of alcohol and drugs.*[iii]

However, not all policy makers or communities would accept the theory of rational addiction, nor the costs resulting. Moreover, there are several countering concerns including:

- some consumers are poorly informed on the delayed impact of alcohol consumption, and there is a perception, especially among young drinkers, that whatever the risks 'they don't apply to me';

- as observed in most countries, there is a change in preferences and behaviours with age. The decline in alcohol consumption levels with age is common to most countries;

- the existence of a welfare system that will look after people if they become ill, disabled or unemployed creates a 'moral hazard', meaning people are likely to take on more risks than if the safety net were unavailable;

- the heavy expenditure on the promotion and advertising of alcohol by the industry. Meta-analysis suggests that advertising has little effect at the population levels, but more recent studies focussing on teenagers and young adults indicate that these

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iii   Crampton, E. and Burgess, M. (2009), p. 13.

promotions and advertisements are highly attractive and effective in stimulating alcohol consumption. Since other research indicates that age of first commencing drinking is a strong predictor of lifetime drinking patterns, advertising and promotion may have a major impact even if it does not change patterns once they are established. These issues raise the question "*In what sense can the preferences of individual consumers be said to be 'sovereign', as distinct from 'manipulated'?*"; and

- the evidence suggesting that peer group pressure is strongly influential in individual values, preferences and drinking behaviour, which again raises the question of the sovereignty of the preferences of individual consumers.[iv]

The policy relevance of this discussion is that the magnitude of consumer surplus – the economist's preferred method of measuring the level of, or change in, consumer benefits – is directly determined by whether we accept (or 'correct') the observed demand curve.

This leads to the third related question, how should consumer surplus be defined and measured in the case of extra-ordinary goods such as gambling and alcohol? In addressing this question it is useful to distinguish between the value judgements and their analytical implications.

Value judgements on equity and rationality

A range of views and value judgements can be distinguished across the spectrum ranging from strongly paternalistic to strongly libertarian. These include the following.

- alcohol is a drug and confers no benefits in terms of consumer satisfaction. Thus, the loss of consumer satisfaction does not need to be taken into account. Alcohol imposes costs that are unmatched by any benefits. This approach has been taken in the past by many alcohol researchers;

- Moderate drinkers gain benefits, but heavy drinkers gain only the same benefit as do Moderate drinkers. Therefore, not only can the consumer benefits of risky drinking be set aside, but costs previously matched by benefits become unmatched and must be brought to account. This is the alcohol counterpart of the Productivity Commission's analysis of gambling in Australia;

- drinking beyond moderate levels may still confer some genuine satisfaction and willingness-to-pay surveys can be used to distinguish between benefit and

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[iv] Of course there are alternative views to the impact of advertising and peer pressure.

Even if alcohol promotion changes preferences, does that mean that the new preferences are less authentic than the original ones? Social marketing tries to do the same for the public good (eg don't litter), and this is not viewed as a distortion of consumer preferences. Advertising is a very complex area in respect of preference formation. If the community genuinely does not like it, why not ban or modify the advertising directly? If advertising has this effect for alcohol, it may have the same effect for many other consumer goods, which would raise some very broad policy implications surrounding sovereignty and the regulatory state.

Peer group pressures fall into the same vein. Our preferences must be formed somewhere – genes, family background, peers, life experiences — the fact that they have different origins does not necessarily invalidate benefit cost analysis. Maybe there are some more subtle arguments around peer pressure where people do what others expect them to do through fear, though not wanting to do so, and where the result is some unpleasant equilibrium in which everyone would like to reduce drinking but no one wants to be seen as 'uncool'.

dis-benefit. This approach has been applied by Vining and Thomas (2006) in the case of tobacco; and

▪ drinking is a matter of individual choice, preferences are sovereign and the cost of harms are mainly internalised to the individual and only the small costs to wider society are relevant. This approach is consistent with Barker (2002) and Crampton and Burgess (2009).

If either the second or third value judgement on the degree of irrationality is made, it is necessary to correct the demand curve, and to reassess costs and benefits. Correcting the observed demand curve to remove the impacts of irrationality means that the benefits and costs of alcohol consumption must now be reassessed against the corrected, non-compulsive demand curve. [v] This has several effects:

▪ magnitudes of total consumer surplus and of any change in consumer surplus as a result of a tax increase – or other intervention – are substantially reduced; and

▪ some part of the production costs that were previously offset by the benefits of consumer satisfaction are no longer offset once the corrected demand curve is acknowledged. As a result, this part of production costs is an unmatched cost. When assessing total costs and benefits of the industry, this cost should be recognised, and, when assessing the benefits and costs of a tax increase, the reduction in these costs should be treated as a benefit.

As noted above, for some non-normal goods, the benefits of consumption may be actually less than the consumption. There is an amount of irrational consumption. Assuming consumers would have a lower willingness to pay for alcohol if they were rational and aware of the full costs, the demand curve (which measures willingness to pay for different quantities of consumption) shifts inward from D_0 to D_1 in Figure A.4. This has a number of significant impacts:

▪ consumer surplus is estimated to be much lower (the triangle *a* in Figure A.4 compared with the larger consumer surplus triangle that would exist if the demand curve were not adjusted); and

▪ there is a range of alcohol consumption over which the price of alcohol exceeds the true willingness to pay for alcohol (according to the adjusted demand curve), meaning there are costs to consumers that are unmatched by benefits.

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[v] For a fuller discussion on these issues, refer to Productivity Commission 1999, *Australia's Gambling Industries: Inquiry Report Vol. 3 Appendices*, 'Appendix C: Estimating Consumer Surplus'. This report contains a rigorous exposition of how to interpret consumer surplus in the context of compulsive or addictive behaviour (http://www.pc.gov.au/__data/assets/pdf_file/0006/82554/gambling3.pdf).

Figure A.4: Adjusting the demand curve for 'irrationality'
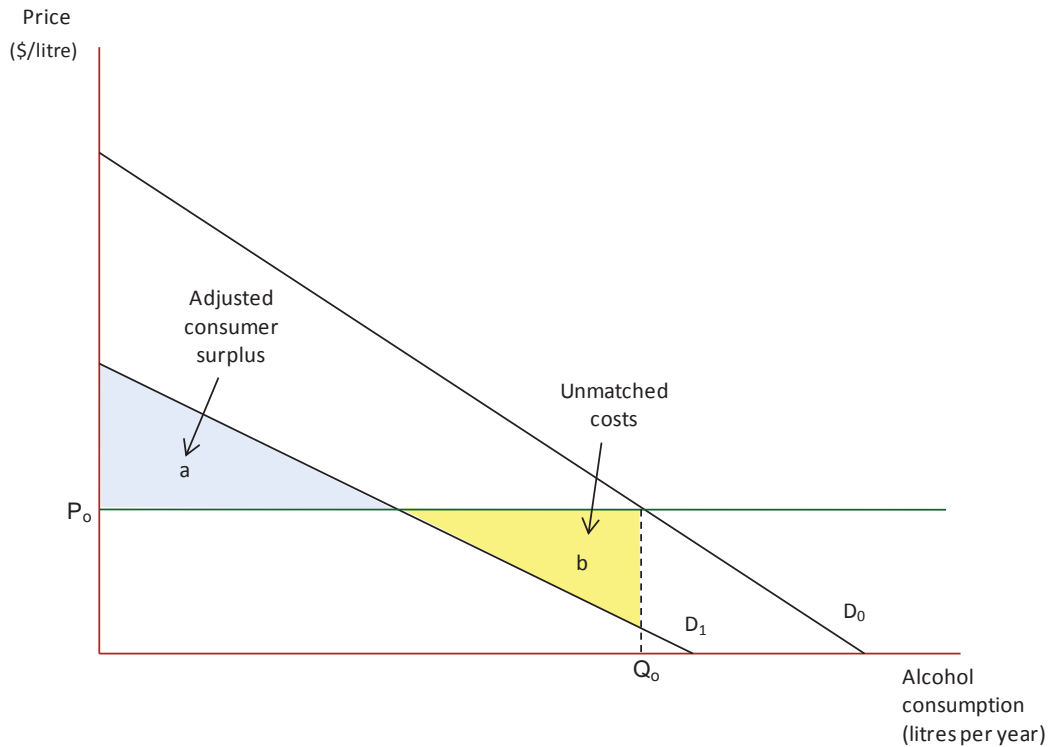
Assuming there is irrational demand and that the demand curve needs correcting, the welfare implications of an excise tax increase (Figure A.5) are different from the case of a normal good.

An excise tax increase leads to the following benefits:[vi]

- a reduction in unmatched costs of b'': and

- excise tax revenue of $a'' + c$.

At the same time it leads to a cost of:

- a reduction in consumer surplus of a''; and

- a transfer between drinkers and government of c.

In net terms, the benefits of the excise tax increase are b''.

While this is a gross simplification, and we have abstracted from the loss of consumer surplus relating to rational alcohol consumption (where demand curves do not need adjusting), it illustrates that for irrational alcohol consumption:

- true (adjusted) consumer surplus and the loss of consumer surplus due to excise increases is more than offset by the gain in excise tax revenue; and

- there may be significant costs of consumption unmatched by consumer surplus benefits, and these costs can be reduced through an excise tax increase.

[vi]   In this example, we will ignore any existing taxes.

Figure A.5: Impact of an excise tax increase

Combining the measurement of changes in consumer surplus under irrationality with the presence of existing taxes results in a slightly more convoluted estimation.

The message for benefit cost analysis is that analysts need to state value judgements explicitly in the assumptions. Further, the analysis could be sensitivity tested to reflect the results of different value judgements. Decision makers can then consider the analytical results that correspond to their view of the appropriate value judgement, taking into account the community's preferences.

Figure A.6: Cost-benefit analysis with tax increases and irrationality
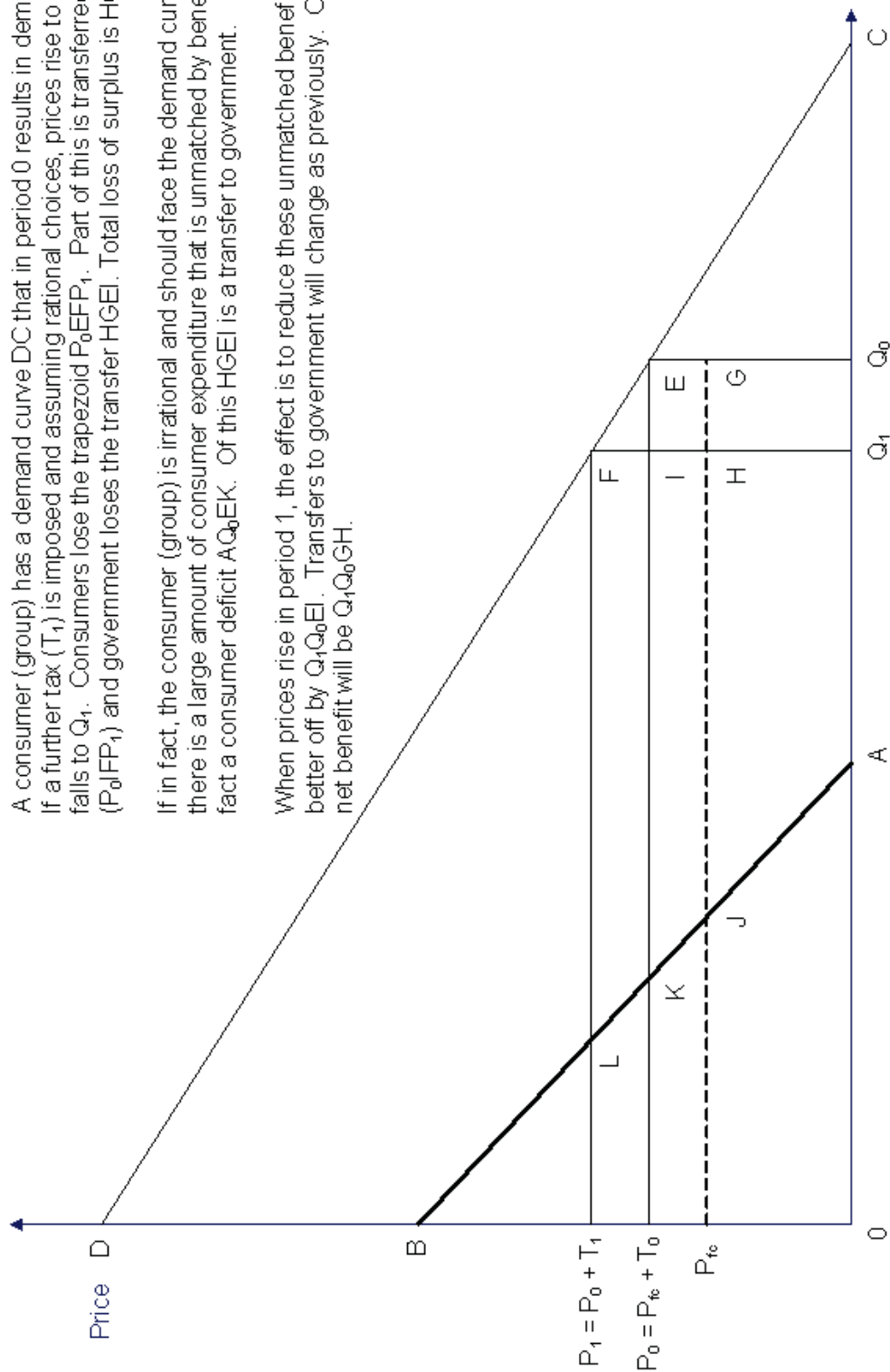
A consumer (group) has a demand curve DC that in period 0 results in demand Q_0 at price P_0. If a further tax (T_1) is imposed and assuming rational choices, prices rise to P_1 and demand falls to Q_1. Consumers lose the trapezoid P_0EFP_1. Part of this is transferred to government (P_0IFP_1) and government loses the transfer HGEI. Total loss of surplus is HGEF.

If in fact, the consumer (group) is irrational and should face the demand curve BA, in period 0 there is a large amount of consumer expenditure that is unmatched by benefits -- there is in fact a consumer deficit AQ_0EK. Of this HGEI is a transfer to government.

When prices rise in period 1, the effect is to reduce these unmatched benefits. Consumers are better off by Q_1Q_0EI. Transfers to government will change as previously. Consequently, the net benefit will be Q_1Q_0GH.

Appendix B. Relevance and quality of Australian estimates of the costs of alcohol

B.1 Australian estimates of the social cost of alcohol

Estimates of the costs of alcohol include both what may be labelled as tangible costs (e.g., costs to the health system, lost output) and intangible costs associated with loss of life (using a value of a statistical life year). There are two sources of the social costs of alcohol that are relevant to this review:

- Collins and Lapsley's 2008 estimate of the costs of alcohol-related harm in 2004/05 of **$15 billion**; and

- the Laslett *et al* (2010) estimate of the costs of alcohol-related harms to others of over **$20 billion**.

For the purposes of this analysis we have taken a very conservative approach to the inclusion of costs of harms. One key effect of this approach is that our estimates represent the **lower bound for the effect of changes to alcohol taxation** not the expected or average. Therefore to the extent that harms currently excluded should be accounted for, the benefits of measures will be higher – in some cases, an order of magnitude higher.

Estimates of the costs of alcohol include both what may be labelled as tangible costs (e.g. costs to the health system, lost output) and intangible costs associated with loss of life (using a value of a statistical life year). There are three social costs of alcohol estimates that are relevant to this review:

- Collins and Lapsley's 2008 estimate of the costs of alcohol-related harm in 2004/05 of **$15 billion**;

- the Laslett *et al* (2010) estimate of the costs of alcohol-related harms to others of over **$20 billion**; and

- the combined Collins and Lapsley and Laslett et al costs of around **$36 billion** used by FARE in media releases and explained by Doran *et al.* (2010).

Table B.1: Estimated total social costs of alcohol in Australia; 2008

Social cost item	Tangible $ million	Intangible $ million	Total $ million
Collins and Lapsley, 2008			
Labour (i.e. lost productivity) costs	3,975	–	3,975
Healthcare costs	2,221	–	2,221
Road accident costs	2,474	397	2,871
Crime not elsewhere included	1,600	–	1,600
Resources used in abusive consumption	1,897	–	1,897
Loss of life	-	4,646	4,646
Collins and Lapsley sub-total	**12,167**	**5,043**	**17,210**
Laslett et al., 2010			
Child protection system	672	–	-
Effects on household/family member or friend with most effect	9,424	7,364	16,788
Property damage by stranger's drinking	1,133	–	1,133
Counselling, advice, treatment expenses	110	–	110
Laslett sub-total	**11,339**	**7,364**	**18,703**
Total	**23,506**	**12,407**	**35,913**

Source: Doran et al., 2010, p. 19.

The Doran *et al* (2010) estimates include adjustments for double-counting, but it remains subject to the critiques of Collins and Lapsley (2008) and Laslett *et al* (2010) made by Access Economics (2008, 2010).

B.2   Assessment of Collins and Lapsley

The Access Economics criticisms of Collins and Lapsley (2008) and Marsden Jacob's views are presented in Table B.2.[vii] The key and general criticism of the cost of illness studies is that they address the wrong question and measure the societal costs incurred in a current year due to current and past drinking. This distinction (between this backward looking approach and a forward looking approach used for policy evaluation) is a particularly relevant issue for health costs (arising from cancer, cirrhosis and so on) since these diseases – or their increased incidence – are primarily driven by long-term levels of drinking. It is not an issue for costs driven by short-term episodic drinking or other drinking in the current year.

[vii]   There are more extreme critiques of the social cost studies than Access (2008, 2010), particularly Crampton and Burgess (2009), who critiqued a study by BERL (2009), which essentially replicated Collins and Lapsley (2008) for New Zealand. These critiques argue that any harms to individuals themselves should not be included because individuals rationally choose to incur the harms associated with their alcohol consumption. For example, Crampton et al (2011) estimates cited by the National Alcohol Beverage Industries Council (NABIC) would reduce the Collins and Lapsley (2008) estimate of $4.1 billion due to loss of life to $0.2 billion.

Broadly, we consider that some of the substantive criticisms of Collins and Lapsley (2008) are warranted, particularly the use of the so-called demographic approach. This approach is related to the following definition of the economic costs of drug abuse (including alcohol abuse) in Collins and Lapsley (2008, p. 3).

> *The value of the net resources which in a given year are unavailable to the community for consumption or investment purposes as a result of the effects of past and present drug abuse, plus the intangible costs imposed by this abuse.*

This demographic approach does not provide suitable cost estimates for policy analysis because bygones are bygones, and what is relevant for policy is drinking today and whether changes in levels of current alcohol consumption can affect current and future costs. Given higher per capita rates of alcohol consumption in the 1970s and 1980s than today, it is possible the social cost estimates in Collins and Lapsley (2008) overstate the levels of long-term harms arising from current drinking. Of course, this may not be the case if current patterns of consumption, involving more bingeing, are more harmful than historical patterns.

In any case, quantifying the magnitude of over-statement of costs driven by long-term consumption levels would require a re-running of the Collins and Lapsley (2008) analysis using a forward looking approach.

Other criticisms of Collins and Lapsley (2008) are less substantive and in some cases, responding to Access Economics' criticisms would increase the estimate of the cost item (e.g., criticisms around value of life and pain and suffering).

Table B.2: Access Economics criticisms of Collins and Lapsley (2008)

Access Economics criticisms	MJA comments
1. Demographic approach is backward looking (over last 40 years) and over-states cost of current alcohol consumption.	Access Economics is correct that a forward-looking approach should have been adopted. Hence, Collins and Lapsley's estimates are likely to be over-stated but the extent of the over-statement would require a re-running of the Collins and Lapsley exercise using a forward looking approach.
2. Undocumented estimate of 30 per cent of consumption as abusive.	While the parameter is undocumented it is plausible, especially considering the estimated proportion of consumption in excess of NHMRC Guidelines (e.g. Stockwell *et al*., 2002).
3. Collins and Lapsley include a "very weak discussion" of the issues involved in valuation of life.	Access Economics' approach would tend to increase Collins and Lapsley's estimates relating to the valuation of life as Access Economics (2008, p. 10) notes the value of a statistical life year used by Collins and Lapsley is "extremely low".

4. Pain and suffering costs are attributable to more than just road accidents.	Again, adopting Access Economics' approach would tend to increase Collins and Lapsley's costs estimates.
5. Attributable fractions are assumed unchanged historically between 1947 and 2005.	Attributable fractions from Begg *et al*. (2007) could be used instead, as noted by Access Economics (2008, p. 16).
6. There is a risk of over-estimation of crime costs because it is not possible to determine "true" attributable fractions, as acknowledged in Appendix B of Collins and Lapsley (2008).	As Access Economics (2007, p. 17) notes, this is one of the smaller cost items. Hence, any over-estimation should not substantially affect the broad order-of-magnitude of the cost estimates. Nonetheless, there needs to be downside sensitivity analysis.
7. In estimating health system costs, Collins and Lapsley combined partial and incomplete data sources rather than using superior AIHW data.	The AIHW data would lead to more reliable estimates, however whether there is any bias in Collins and Lapsley's estimates (and the direction of any bias) is unclear.
8. Productivity losses are upward biased due to a range of issues including old (1990) data and high estimates of absenteeism due to alcohol, and the use of the demographic approach. Collins and Lapsley's estimates cannot be replicated, as there is insufficient explanation of data sources.	There are grounds for caution regarding this large cost item (around $4 billion) and hence it should be subject to significant downward sensitivity testing. New work is required to quantify transparently this source of costs.
9. Road accidents costs estimates are not based on the most recent data.	It is unclear whether using the most recent data would change the broad magnitude of the estimate.
10. Resources used in abusive consumption should not be counted.	Where consumption decisions are irrational or not fully informed, there are costs unmatched by benefits and these should be counted.

Source: Marsden Jacob, 2011, based on Access Economics (2008) and Collins and Lapsley (2008).

B.3 Assessment of Laslett et al

The Access Economics criticisms of Laslett *et al* (2010) and Marsden Jacob's views are presented in Table B.3. The criticisms made by Access Economics against Laslett *et al*. (2010) were largely contested by the authors, and hence the estimates may be considered more robust than those in Collins and Lapsley (2008) (Table B.2). Broadly, Marsden Jacob considers that Room *et al*. (2011) have responded effectively to Access Economics' criticisms. Nonetheless, there a couple of contentious items that are open to debate.

Hence to be conservative, Marsden Jacob recommends that a range of social cost estimates be used in sensitivity analysis.

Table B.3: Access Economics criticisms of Laslett et al. (2010)

Access Economics criticisms	Laslett et al. response (Room et al., 2010)	MJA comments
1. Over-estimation of magnitude and impact of alcohol's harm to others due to survey-related biases, including: non-response bias; proxy interviewing; ordering bias; and recall bias.	Response rate similar to other current population phone surveys. Re. proxy interviewing, estimating harms to others necessarily involves asking people about effects of someone else's drinking. Ordering bias criticism ignores the fact most serious outcomes are not always presented first. Finally, any recall bias would tend to under-estimate harms to others.	Laslett *et al*. (2010) have provided a strong rebuttal of Access Economics' criticisms.
2. Over-estimation of attributable fractions due to not controlling for other risk factors.	Access Economics is at odds with international public health research literature. Access Economics' proposed approach does not deal properly with conditional causation.	Laslett *et al*. (2010) is consistent with the leading Australian public health approach to estimating attributable fractions in Begg *et al*. (2007).
3. Incorrect methods used to estimate the costs associated with impact of others' drinking, including reliance on NHMRC cut offs for long-term risky drinking.	The Household, Income and Labour Dynamics in Australia (HILDA) survey data Access Economics relies on to demonstrate limited impacts on health and satisfaction due to spousal drinking may have been affected by biased HILDA panel sample. Problematic drinkers among relatives/friends identified in the survey were drinking far in excess of NHMRC threshold.	Laslett *et al*. (2010) have provided an effective rebuttal of Access Economics' criticisms.
4. Double counting of intangible costs in the estimation.	Access Economics is incorrect (Room *et al*., 2011, p. 15).	Laslett *et al* (2011) did not double count.

Access Economics criticisms	Laslett et al. response (Room et al., 2010)	MJA comments
5. Treating people as employed when they are not over-states productivity losses.	Laslett *et al*. (2010) used estimate of AWE across full-time and part-time workers, and incorrect to assume opportunity cost of not employed person's time is zero.	Laslett et al. (2010) approach is defensible but agree using 100 per cent of AWE to cost time spent overstates problem.
6. Treating money spent on drinking as a cost of alcohol on others is incorrect as money saved from not drinking may have also have been spent on self.	Criticism is incorrect (Room *et al*., 2011, p. 15). This amount was not included in total costs.	Criticism is not justified.
7. Estimates of the time spent caring for others due to their drinking are unreliable, as they may overlap with "normal activities".	Not a credible objection because respondents were asked "how much time did this take out of your normal routine?"	There is some merit in Access Economics'' criticism here, as time has not necessarily been lost from productive activities. Time spent caring may simply replace time people would have spent with loved ones anyway.
8. There is a large potential for error in attributing property damage by strangers to alcohol consumption.	The survey question was clear in asking respondents to identify alcohol-related damage.	Access Economics' criticism appears unwarranted.

Source: Marsden Jacob, 2011, based on Access Economics (2010), Laslett et al. (2010) and Room et al. (2011).

6.2.1 Conclusions

There are several valid criticisms from Access Economics of the methodologies adopted in Collins and Lapsley (2008) and the resulting possibility of overstating the costs. The cost of illness estimates from Collins and Lapsley overstate the base level of costs due to the contribution of current levels of alcohol consumption. The methods and parameters used are not always well documented and superior and more recent data could have been used.

While the criticisms directed at the Laslett *et al* (2010) study may lead to only minor downward revisions, those directed at Collins and Lapsley (2008) could lead to major revisions, as the backward looking demographic approach is a major deficiency.

Given the debate about the appropriate value of a statistical year of life, upward sensitivity analysis also needs to be conducted. This would also take into account the new evidence on alcohol-related harms that has emerged since the estimation of the

attributable fractions used by Collins and Lapsley (2008). This could include, for example, a wider range of cancers associated with alcohol (Cancer Council Australia, 2011).

Appendix C.   HTO included and excluded from current study

Table C. 1: Estimates of cost of harms

Source / Type	Description	Notes	Original estimate	Treatment in model	Value used in base model	Other treatment
COLLINS AND LAPSLEY			**2004/05 dollars million**			
Tangible estimates						
Labour in the workforce	Reduction in workforce		$3,210.7	Not included	$0.00	
	Absenteeism		$367.9	Not included	$0.00	
Labour in household	Premature death		$1,423.9	Not included	$0.00	
	Sickness		$146.9	Not included	$0.00	
Less resources saved			–$1,611.3	Not included	$0.00	
Healthcare	Medical	Direct expenditure	$540.7	Not included	$0.00	
	Hospital	Direct expenditure	$662.2	Not included	$0.00	
	Nursing homes	Direct expenditure	$401.2	Not included	$0.00	
	Pharmaceuticals	Direct expenditure	$297.6	Not included	$0.00	
	Ambulances	Direct expenditure	$74.8	Not included	$0.00	
Road accidents n.e.i.			$2,202.0	Not included	$0.00	
Crime n.e.i.	Police	Direct expenditure	$747.1	100% included	$771.96	
	Criminal courts	Direct expenditure	$85.8	100% included	$88.65	
	Prisons	Direct expenditure	$141.8	100% included	$146.52	
	Property		$67.1	Not included	$0.00	
	Insurance administration	Direct expenditure	$14.3	100% included	$14.78	

Source / Type	Description	Notes	Original estimate	Treatment in model	Value used in base model	Other treatment
	Productivity of workers	Estimate	$368.0	Not included	$0.00	
Resources used in abusive consumption	(Analogous to unmatched expenditure)		$1,688.8	Not included (estimated in model)	$0.00	
Intangible						
Loss of life		Uses $53k	$4,135.0	Not included	$0.00	
Pain and suffering (road accidents)			$353.6	Not included	$0.00	
Mayhew						
Theft, Burglary	Property loss, time spent, medical costs	Excludes intangible costs	$111	100% Included	$141	
Laslett et al			2008/09 dollars million			
Morbidity/mortality						
Child abuse	Hospital/health costs		$0.95	100% Included	$0.95	
Child road crash	Hospital/health costs		$2.65	100% Included	$2.65	
Adult road crash	Cost of time lost/spent		$3.33	Not included	$0.00	
	Hospital/health costs		$27.06	100% Included	$27.06	
Adult assault	Cost of time lost/spent		$5.32	Not included	$0.00	
	Hospital/health costs		$38.23	100% Included	$38.23	
Well-being						
Drinker in household	Intangible costs		$1,500.72	Not included	$0.00	
Drinker elsewhere	Intangible costs		$7,032.98	Rebased per $53,000	$7,703.01	

Source / Type	Description	Notes	Original estimate	Treatment in model	Value used in base model	Other treatment
Assault victims	Out of pocket costs		$0.66	Not included	$0.00	
	Cost of time lost/spent		$57.68	Not included	$0.00	
	Hospital/health costs		$58.92	100% Included	$58.92	
Domestic violence victims	Out of pocket costs		$0.26	Not included	$0.00	
	Cost of time lost/spent		$22.93	Not included	$0.00	
	Hospital/health costs		$23.21	100% Included	$23.21	
Child protection costs	Hospital/health costs		$671.61	100% Included	$693.96	
Known drinker	Out of pocket costs		$845.85	50% Included	$437.00	
	Cost of time lost/spent		$9,333.80	10% Included	$964.43	30% included
	Intangible costs		$6,389.58	Not included	$0.00	
Workplace	Cost of time lost/spent		$801.0	100% Included	$801.00m	
Stranger drinker	Out of pocket costs		$1,619.00	100% included	$1,672.87	
	Intangible costs		$5,331.81	Not included	$0.00	
Services used						
Alcohol treatment system	Hospital/health costs		$2.86	100% Included	$2.86	
Phone helpline	Cost of time lost/spent		$0.06	Not included	$0.00	
	Hospital/health costs		$0.21	Not included	$0.21	
Survey: help seeking	Out of pocket costs	Survey based	$109.79	100% included	$113.44	
	Cost of time lost/spent		$720.35	Not included	$0.00	

Source / Type	Description	Notes	Original estimate 2009/10 dollars million	Treatment in model	Value used in base model	Other treatment
Other costs included						
Mortality	Inclusion of deaths identified by Laslett	Valued at $3m per life		Included	$1,136.60	
TOTAL					**$15,061.08**	

Appendix D. Economists' value judgements versus revealed social preferences

While there are marked differences in approach by health and economic professionals, there are also differences between how economists often look at this issue compared with the judgements and preferences of Australian society.

Consistent with the purpose of BCA to measure changes in the welfare of society as a whole we reject many of the more extreme assumptions promulgated by some economists, on the grounds that their assumptions and value judgements are not consistent with observed facts or the considered and consistently revealed social welfare preferences of Australians.

Thus, **we reject** that:

- families make the decision on how much individuals drink.[i] We have rejected this assumption since it accords neither with the facts, nor with the judgements of Australians and most western societies. The children in a family do not participate/share in or endorse the decision of a parent to drink to risky levels: neither the child born with fetal alcohol syndrome, nor the abused child;

  It is also strangely inconsistent to assume both that not only are children part of the decision making process but that the decision making process is fully rational, perfectly informed and optimal in any sense;

- there is no case for public intervention to protect or reduce family violence because family members choose to stay in an abusive relationship or risky situation. We have rejected this value judgement because it does not accord with the judgement of Australians – as expressed, for example, in the legislation of all Australian parliaments. Similarly, neither public policy economists nor Australian society has accepted the equivalent argument that passengers getting into a vehicle where the driver may be intoxicated do so in full and perfect knowledge of the actual levels of driver intoxication, driver skill, potential road hazards or the safety features of the car. Thus, Australian society has also rejected the corollary views such as:

  > *Where loss of life or accident cost is borne by the drinker, the cost is viewed as internal and not relevant to policy-making.[ii]*

  Such a view would deny government policy mandates to improve the health of individuals through influencing lifestyle and consumption choices. Governments, however, act in a variety of ways to discourage choices that adversely impact the health of individuals, and hence this value judgment does not appear compatible

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[i] Heien, D., & Pittman, D. (1989). "The economic costs of alcohol abuse: An assessment of current methods and estimates", *Journal of Studies on Alcohol*, Vol. 54, pp. 302-308. Recent Australian studies employing this assumption include otherwise mainstream economists such as Fogarty (2011), Freebairn (2009) and Clarke (2008).

[ii] From National Alcohol Beverage Industries Council (NABIC) media release of 13 July 2011. Canberra.

with the value judgments that governments across Australia have made historically or are currently making. Indeed, all Australian States and Territories have seen strong and valid cases for public intervention in the form of mandatory breath testing for maximum blood alcohol levels or for minimum safety standards in motor vehicles.

Nonetheless, this extreme view highlights first, the need to make explicit the value judgments in BCA. Secondly, it highlights the need to recognise that BCAs – and public policy discussion – can employ assumptions which might be considered quite inconsistent with social preferences. i.e., community norms; and

- the inclusion of criminal gains as benefits in a BCA.

The usual economic approach to crime is dominated by the thinking and models initiated by Becker (1968). Crime is correctly recognised as an economic activity, but the approach of Becker and subsequent authors is then extended erroneously to treat this economic activity normatively as one which generates welfare. Thus, society's welfare is not diminished by crime as such. This view admits that crime may involve adverse externalities but these are rarely costed for inclusion in benefit cost analyses. Thus, the only detriment to the welfare of society as a whole is the efficiency loss from the cost of fighting crime and running the criminal justice system. This approach is followed in most benefit cost studies and in the cost of illness estimates for drugs and alcohol prepared by Collins and Lapsley (2008).

This conventional approach seems seriously flawed, however. As noted by Trumbull (1986)

> *this approach clearly treats all laws as tolerant institutions. That is, crimes are seen as productive activities that generate negative externalities. The role of criminal justice, according to this view, is to establish a vector of prices, in the form of detection and punishment, that balances the marginal social benefits of reducing criminal activity and the marginal social costs (which include lost private gains from criminal activity).*

> *But the criminal laws are absolute, not tolerant, institutions. [By] treating absolute institutions as tolerant institutions, the usual economic models of criminal justice are mis-specified. Missing from these models is the realisation that society has a purpose when it labels certain acts criminal; the label communicates that these acts will not be tolerated or counted in the social weal. This is probably the distinction that Stigler ... has in mind when he asks for evidence that society values criminal gains, noting that "society has branded the utility derived from such activity as illicit." And something of this sort must be behind the thinking of Brennan and Buchanan when they complain of economists who treat criminal justice in the same way they would treat consumption of soft drinks.*[iii]

[iii] Brennan *pers. comm.* (2012) elaborates: Suppose crime is considered like buying something at the Coke machine. You can get your can of coke if you just put in the (expected) cost. Punishment is just the cost to the punishee of enduring it. And if the expected benefit to the perpetrator exceeds the expected loss to the victim by more than the expected cost of punishment then the crime ought to proceed.

But surely, one might say, there is a normative dimension to crime that is omitted in this calculation -- something that reflects the fact that crime is intrinsically wrong. The mere fact that there are crimes that

Thus, the usual treatment of criminal gains in cost-benefit analysis and in cost of illness studies, in which theft is accounted for as a transfer; and a reduction in rape comes at a social loss (as well as a gain) because rapists are denied opportunities to rape, is not consistent with existing social constraints.

Criminal gains should not have standing in cost-benefit analysis.

As Whittington and MacRae note, this conclusion comes not from a sense of moral outrage, often enough expressed by critics, but from the purely technical point that a BCA must be consistent with both the physical and social constraints that define the environment within which the project's or policy's effects will occur.

As noted by Zerbe (1991), the conclusion to exclude criminal gains as benefits in an analysis of the benefits and costs to society "*rests – and can only rest – on a pattern of rights in which it is settled that the thief has no right to illicit gains. Society and the legal system are clear about the absence of the right for illegal gains.*"[iv]

We have chosen not to explore these extreme value judgements, since they do not reflect either the facts or the considered and consistently revealed social preferences of the Australian community. Bluntly, we do not wish to give the extreme judgements airtime and validity in serious public policy analysis.

Although drawing a line against some of the more extreme value judgements which have found their way into otherwise mainstream analysis, our basic stance is to examine the benefits and costs of alcohol taxation reform and rate increases in a way which otherwise minimises the degree of contention and to do so in a manner which is demonstrably conservative.

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it does not pay the state to avoid does not actually make that crime level "optimal" in the normative sense. There is a normative loss over and above the loss to the victim associated with the fact that a wrong-doing has been perpetrated. (This of course does not imply that the normative loss in question is "infinite" whatever exactly that may mean.)

[iv] Zerbe (1991) further notes that we can in fact, imagine a prior, more fundamental decision, made perhaps on a potential Pareto (also known as the hypothetical compensation) criterion, "*the thief should not profit from his crime so that illegal goods in the hands of a thief should count for zero.*". Quoted from Zerbe, R.O.Jr. (1987) "The Ethical Foundation and Benefit Cost Analysis", working paper.

Appendix E. Productivity costs – absenteeism

Misuse of alcohol impacts on workplace productivity and in fully employed economy on national output. Output may be lost as a result of alcohol-caused premature death, absenteeism, workplace accidents reduced productivity, and excess unemployment.[v] The costs of alcohol-related absenteeism and productivity are popularly reported to be $10 to $30 billion.

To the extent that alcohol abuse lowers a workers lifetime earnings, the heavy drinker bears at least some part of the costs also imposed on the family and younger generation and taxpayer through Australia's age and disability pensions, medical safety net and so on.

Alcohol abuse involves collateral costs on workers other than the drinker and to the employer, and possibly along the supply chain.

Estimating the costs of absenteeism

The methodology for calculating the costs of alcohol-related absenteeism and productivity loss includes:

- **The friction-cost method**. This method assumes that the economy or region is at less than full employment, that employees can be readily hired, and that employers only face friction costs in replacing employees who are absent from work due to their misuse of alcohol. Access Economics (2008) suggests this approach is more appropriate in developing countries where unemployment rates are higher.

    "In our extensive global cost of illness work summarised in Section 1, Access Economics uses Australian data on employment and wage rates by age and gender to estimate productivity losses using a human capital approach and recommends this approach in cost of illness analysis in developed countries (the frictional approach is more appropriate in developing countries where unemployment rates are higher)." (Access Economics, 2008, p. 5)

The friction-cost method will produce relatively low estimates of the productivity costs of alcohol-induced absenteeism.

- **Full cost methods** such as used by Collins and Lapsley (2008) and others. In simplified form, cost of alcohol related absenteeism is the number of days multiplied by the average wage. Pidd *et al* (2006) calculated the cost of alcohol-related absenteeism by totalling the number of days off for each risk category and multiplying that by the equivalent of one day's wage plus 20 per cent employer on-costs. BERL (2009) argued that the value to society of lost output is considerably larger than lost earnings alone, and resultantly scaled up the earnings

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[v] Some studies also consider the productivity losses experienced in the household sector from alcohol misuse (e.g. Collins and Lapsley, 2008).

profiles to reflect the difference between wages and residual value added. These methodologies produce much higher estimates than the friction-cost approach.

The choice of methodology should reflect the situation. Factors potentially impacting on the productivity costs of alcohol-related absenteeism include:

- the characteristics of the sector of employment (e.g., the opportunity cost of stoppages, level of unionisation, the nature of the employment contracts and how complementary labour and capital are in the relevant sector);

- the size of the workplace (e.g. larger firms may have greater willingness to fire employees who exhibit alcohol-related absenteeism than smaller firms); and

- the state of the economy (full employment/less-than-full employment).

As a result, considerable variation in the costs of alcohol in the workplace should be expected across workplaces and over time.

Some Australian businesses (and sectors) have imposed a strongly enforced policy of no alcohol in the workplace suggesting that they regard the cost of alcohol in the workplace as high. For instance, BHP, RTO and other major mining companies enforce a no alcohol policy and this policy has been adopted by their contractors and suppliers, including consulting engineering firms. Other businesses appear (willing or unwillingly) to follow a more tolerant attitude.

Co-morbidities are a confounding issue. Alcohol misuse and mental conditions such as depression can be linked. Thus, some absenteeism and productivity loss may, in some cases, occur regardless of the level and frequency of alcohol abuse.

None of the available studies or estimates for Australia addresses these methodological issues. Accordingly, despite their likely significance we have not included the productivity costs associated with alcohol-related absenteeism in the current study.[vi] Pidd *et al* (2006) estimated the cost of alcohol through absenteeism (either directly or indirectly from injuries caused by alcohol) at $437 million based self-reporting in 2001. Alternatively, the incidence of absenteeism from injuries or disease was the equivalent of 7.5 million days or $1.2 billion.[vii]

[vi]   Access Economics (2008) Collins and Lapsley Report Review – 28 November 2008. BERL (Business and Economic Research Limited) (2009) Costs of Harmful Alcohol and Other Drug Use. Collins, D. and Lapsley, H. (2008) The Costs of Tobacco, Alcohol and Illicit Drug Abuse to Australian Society in 2004/05. Crampton E. and Burgess M. (2009) The Price of Everything, the Value of Nothing: A (Truly) External Review of BERL's Study of Harmful Alcohol and Drug Use. Marsden Jacob Associates (2009) The benefits, costs and taxation of alcohol: Towards an analytical framework., report for New Zealand Law Commission. Pidd, K., Berry, J., Roche, A., and Harrison, J. (2006) Estimating the Cost of Alcohol-Related Absenteeism in the Australian Workforce: the Importance of Consumption Patterns.

[vii] Pidd et al (2006), p. 639.

Appendix F.   Drinkers as victims – incidence of harms from others' by drinking category of victim

Drinking pattern		No.	% physically assaulted	% verbally abused	% had property damaged	Mean cost of property damage ($)	Mean time spent caring (hrs)	% experienced at least some harm from others' drinking
Episodic drinking level, AND	Long-term drinking level							
Abstainer		408	2.9	20.6	9.6	78.1	46.4	36.8
No 5+ episodes	Up to 2 drinks per day	954	2.3	21.4	9.9	53.5	15.8	45.5
Occasional (less than weekly) or no 5+ episodes	Up to 2 drinks per day	907	6.0	36.7	19.7	224.1	25.2	57.1
Occasional (less than weekly) or no 5+ episodes	More than 2 drinks per day	77	1.3	18.2	11.7	9.1	113.8	39.0
Regular (weekly or more) 5+ episodes	Up to 2 drinks per day	136	10.3	47.1	29.4	262.6	47.3	61.8
Regular (weekly or more) 5+ episodes	More than 2 drinks per day	166	9.6	39.8	21.7	283.2	5.3	53.0

Sources: Alcohol's harm to others survey, Australian adult population, 2008 (Laslett et al., 2010).
Cross tabulations requested from and provided by Robin Room and Michael Livingston, Centre for Alcohol Policy Research.

Notes: Physical assault in the last 12 months includes assault by a drinker know to the respondent whose drinking most adversely affected the respondent in the last year, or by a stranger or person not well known to the respond. Verbally abused similarly includes both these categories of abusers, as does property damaged. Mean cost of property damage is as reported by respondents reporting such damage (from either category of other), on a base of all respondents, including those with no damage. Time spent caring is likewise calculated on a base of all respondents. Those who "experienced some harm" whom the respondent provided care in the last 12 months, and is likewise calculated on a base of all respondents. Those who "experienced some harm" are those responding positively to any of the first three categories, or who spent some time providing care in the last 12 months.

Appendix G. Methodological and research directions

The study provides a framework for a comprehensive analysis of the benefits and costs resulting from changes in alcohol taxation and excises. In addition to calibrating and informing the debate, the discipline of an explicit modelling framework is that it exposes judgements and assumptions on relationships, responses and base data.

The effort required to assemble and calibrate the demand and welfare model described here leads to an agenda for future investigations.

Our agenda for future investigations includes:

- **basic data on the value and volume** of alcohol consumption. These data are currently either too aggregated or missing. The Commonwealth Government could immediately remedy current shortcomings by publishing – or providing researchers on a restricted basis – detailed, beverage-by-beverage data from the excise returns and the WET returns. Since the industry already collects and exchanges these data through Nielsen, the failure of the Commonwealth to provide this data simply protects the industry from external scrutiny;

- **comprehensive data and understanding of forward-looking costs** of existing alcohol consumption levels and behaviours. The existing cost of illness estimates provided by Collins and Lapsley over the past two decades are backward looking and answer a different question to that relevant to policy decisions on alcohol. Moreover, there needs to be a robust and transparent process for methodology development, estimation and documentation. This is a general and major requirement.

  The forward-looking costings should allow the dissection into

  – costs of harms to drinkers paid by drinkers;

  – costs of harms to drinkers paid by others; and

  – the collateral costs of harms to others.

  Of these three categories only the third is reasonably available but not on a comprehensive basis.

  A major and coordinated investment to develop authoritative and comprehensive forward looking costs if required;

- **harms to drinkers paid by others** has to date received little attention. Specific investigations of the incidence of costs across drinkers, consumer categories, governments and the implications of these cost burdens are required for:

  – hospitals and the wider health system;

  – insurance premiums for motor vehicles, home and contents and commercial insurance; and

  – Australia's age and disability pensions, safety net and medical insurance systems; and

- **price, income and advertising elasticities**. The richness of the Sheffield demand system estimates appears to be a distant aspiration only. This is due to the lack of the required Household Expenditure Survey data on a cross-sectional basis for multiple years. The Sheffield estimates were made possible by the exceptionally complete level of support from the UK health and statistical agencies and the long-term tradition of co-ordination of such issues via the National Institute for Clinical Excellence. The options available to Australia to progress analysis involving price, income and advertising elasticities (that is, the responsiveness of demand to changes in income and advertising levels, respectively) need to be realistically and carefully explored and evaluated.

It appears that in Australia for at least the immediate to medium term, the option of comprehensive and systematic sensitivity analyses offers a more robust, realistic, relevant and timely approach to policy evaluation than waiting to reach the El Dorado of comprehensive disaggregated systems estimates of participation and volumetric responses to prices, income and advertising for the range of beverages across the range of drinker categories including risk level, age, gender and consumption patterns.

Appendix H. Analyses of sensitivities of benefits and costs

The BCA simulation model involves multiple assumptions and choices of parameters and values. As indicated, we have sought to use authoritative estimates, and where these are not available, to use conservative estimates.

We have examined the sensitivity of the results to changes in:

- **magnitude of the excise tax rates** set for wine following the abolition of the WET. Specifically, we examined excise rates of $27.05 per LAL and $17 per LAL. As expected, both the benefits and costs are larger for larger changes. Relativities change very little, if at all;

- **cost mark-ups** in the prices of on and off trade beverages. Higher mark-ups reduce the magnitude of the price increase and therefore the magnitude of the net loss of consumer surplus and the magnitude of the benefits of reduced HTO. Qualitative results do not change;

- **the proportions of alcohol consumed** at Moderate, Hazardous and Harmful levels. These proportions were found to be important because a) they change the elasticity estimates for each drinker category,[i] b) they change the base levels of consumption relevant to each drinker category; c) they change the levels of gross loss of consumer surplus and of tax paid for each drinker category; and d) when combined with the likelihood that heavier drinking is associated with greater levels of HTO, they affect the distribution of the benefits of reduced HTO. In brief, the higher the proportion of total consumption consumed at Harmful and Hazardous levels, the higher the net benefits estimated. As a comparison, use of the Fogarty assumptions on the proportions of alcohol consumed at each level understates the levels of high risk drinking and understates the net benefits of reforming and increasing excise tax rates;

- **own price elasticities for each beverage**. The base case is centred on Fogarty (2008) meta analyses estimates but we have also explored simple variations such as all elasticities at minus 0.2, minus 0.4, minus 0.6, minus 0.8 and minus 1.0. The simulation results do not change qualitatively although the estimated net benefits are higher for higher elasticities (see Table H.1). In fact, benefits are reported for elasticities in excess of minus 0.002; and

- **price elasticities by drinker categories**. The base case estimates provide a smaller difference between the elasticities for Moderates and the lower estimates for Hazardous and Harmful drinkers. The higher are the elasticities assumed for Hazardous and Harmful, the larger the reduction in HTO and the greater the net benefits. Adoption of the Sheffield elasticities which have Hazardous and Harmful responses greater than for Moderates for individual beverages gives greater

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[i] The estimated price elasticities for each drinker category adjust as the category shares change or as the category thresholds change.

reductions in the gross loss of consumer surplus, but greater benefits from the reductions in HTO.

Table H.1 : Incidence of benefits and costs for Experiment 1 and 2 –
Sensitivity Case, constant elasticity estimates

Elasticity assumption	All rational	Harmful irrational	Harmful and hazardous irrational
Proportional flowthrough of average to short-term consumption			
Experiment 1: Wine $29.05, no other change			
Fogarty-derived	$229.71	$331.63	$490.75
Constant			
−0.2	$138.77	$213.98	$292.58
−0.4	$278.99	$429.40	$586.60
−0.6	$419.20	$644.82	$880.62
−0.8	$559.42	$856.50	$1,150.50
−1.0	$699.63	$1,008.27	$1,302.54
Experiment 2: Wine $29.05, other up 50%			
Fogarty-derived	$249.94	$566.74	$1,099.78
Constant			
−0.2	$200.63	$465.74	$742.84
−0.4	$402.70	$932.93	$1,487.13
−0.6	$604.77	$1,400.12	$2,231.42
−0.8	$806.84	$1,858.93	$2,905.50
−1.0	$1,008.91	$2,107.13	$3,154.73

Relationship between total and short-term consumption changed

The base case assumes short-term consumption changes proportionately with total consumption. As noted above, the Sheffield analysis found that the effect of changes in long term consumption on short-term consumption (in terms of maximum drunk in one session) was not proportional and varied across different consumers groups.

Applying the Sheffield ratios results in greater reductions in harms and their costs. Overall, under Policy Experiment 1, the cost of harms to others will be reduced by $0.38 billion per year (compared with $0.33 billion in the base case).

Value of carers' time

The base case assumes the value of time for others at 10 per cent of AWE. As a sensitivity test, we examined using valuing time at 30 per cent of AWE. This had the effect of increasing the estimate of harms saved to $370 million per year. The use of a scalar of 30 per cent may still under estimate this cost saving. For example, Access Economics (2005) used AWE to derive an opportunity cost estimate of carers' time and noted this represented a minimum estimate (Access Economics 2005, p. 13). Using the replacement cost of an external carer generated a value six times this estimate.

Under Policy Experiment 1, valuing carer time at 100 per cent of AWE would increase the annual benefits of harms saved by replacing the WET from $330 million to $520 million.

Value of a life year

Under the base case, a life year is valued at around $50,000 in 2004/05. Other estimates suggest life years could be valued at around three times this amount. Substituting a value of $150,000 results in the cost saving increasing to $640 million per year.

Relaxing all three assumptions

If all of the three latter assumptions are progressively relaxed together, the reduction in the cost of harms more than doubles from $330 million to $770 million. If the value of time is set to 100 per cent of AWE, the cumulative effect sums to $940 million.

Other sensitivities

A number of specific sensitivities are reported more fully below, these include:

- quality of life impacts;
- the transmission of average reductions in consumption to short-term consumption;
- the apportionment of the incidence of HTO across consumer groups;
- the incidence of HTO across consumer groups; and
- the role of cross-price elasticities.

The key observation is that, in the absence of cross price elasticities, the model results are linear and additive and the sensitivity testing generally conforms with prior expectations.

H.1 Including all quality of life impacts

The base estimates only include lost quality of life for a sub-set of those others affected drinkers. If all persons affected by drinkers: friends and family as well as strangers are included, the total cost of harms considered in this study would increase from $15.1 billion to $30.2 billion.

The impact of the first policy experiment would see the savings from harms to others increase from $0.33 billion to $0.65 billion. Under Policy Experiment 2, benefits would rise from $0.82 billion to $1.60 billion. That is between $300 million and $800 million in improved life quality outcomes.

Sensitivity of short-term consumption to long-term changes

A third sensitivity examined is how a percentage change in average long-term consumption translates into changes in short-term consumption. The base case assumed a proportional flow-on for all drinkers. If we assume that the Sheffield relativities were correct and applicable to Australia, i.e., the impact of changes in overall consumption have a larger effect for Moderate drinkers and decreasing flow-through for Hazardous and Harmful drinkers, the reduction in harms is only slightly higher – from $0.33 billion to $0.38 billion in the first policy experiment. Under the second policy experiment, the

savings in costs from harms increased from $0.82 billion to $0.95 billion. These increases occur because the Sheffield cross-sectional analysis suggests that while Harmful drinkers don't respond less proportionately to a reduction in average consumption this is more than offset by proportionately greater reductions for Moderate and Hazardous drinkers.

As noted in the main text, we have reservations about the Sheffield relativities and also whether they can be applied to Australian data.

Looking generally at the flowthrough of average to short-term, episodic consumption, under Experiment 2, using the Fogarty centred own-price elasticity estimates and the assumption of perfect rationality, positive net benefits are achieved for a flowthrough of 69 per cent or more. This break-even flowthrough rate is lower where constant own-price elasticity estimates are assumed. The flowthrough issue becomes increasingly less as increasing degrees of irrational behaviour are assumed (or broader definitions of harm). Table H.

Incidence assumptions

The base case examined above considered the incidence of costs from harms to others across drinker groups to be higher for Hazardous and Harmful to the population in each group. This is in line with evidence from Australia on incidence of harms.

However, if we assume the incidence of harms is proportional to the number of people in each drinking type, we recalculated the distribution of costs of harms for each policy experiment (Table H.2 and

Table H.3).

**Table H.2: Incidence of benefits and costs for Experiment 1 –
Sensitivity Case, proportional distribution of harms to others**

	Allocated costs and benefits			
	Non-drinkers	**Moderate**	**Hazardous**	**Harmful**
	$ billion p.a.			
Gross loss of consumer surplus	0.00	−0.35	−0.35	−0.34
Rebate of increased taxation[1]	0.18	0.61	0.11	0.04
Net change	0.18	0.26	−0.24	−0.30
Total cost savings from reduced harms to others	0.06	0.21	0.04	0.01
Total net benefit	**0.25**	**0.47**	**−0.20**	**−0.29**

Note Includes implementation costs.

Source: MJA analysis.

Table H.3: BCA Distribution of effects for Experiment 2 –
Sensitivity Case, proportional distribution of harms to others

Allocated costs and benefits				
	Non-drinkers	**Moderate**	**Hazardous**	**Harmful**
	$ billion p.a.			
Gross loss of consumer surplus	0.00	−1.24	−1.25	−1.21
Rebate of increased taxation[1]	0.61	2.03	0.37	0.13
Net change in welfare	0.61	0.79	−0.88	−1.08
Total cost savings from reduced harms to others	0.16	0.53	0.10	0.03
Total net benefit	**0.77**	**1.31**	**−0.79**	**−1.05**

Note: Includes Implentation costs

Source: MJA analysis.

For both policy experiments, the assumption that harms do not vary across different people worsens slightly the outcomes for Hazardous and Harmful drinkers with Non-drinkers and Moderate drinkers both better off.

H.2 The role of cross-price elasticities

Policy Experiment 1 increases the price of wine alone. The prices of all other forms of alcohol are unaffected. However, since wine is a substitute for other forms of alcohol the fall in demand for wine will be offset in part by increased demand for other beverages.

In the extreme case of perfect substitutes imposing – even a prohibitive tax on one good alone results in no loss of consumer surplus because consumers shift immediately and effortlessly to the second good – which as a perfect substitute gives the same level of satisfaction.

In the case of alcoholic beverages, the degree of substitutability between wine and other beverages is material, albeit less than perfect.

As noted, since the MJA alcohol simulation model uses, as its base form, elasticities centred on the Fogarty meta analysis results, our base version does not model the effects of substitution (i.e., cross price elasticities) between wine and other beverages. As noted, this results in an over-estimate of the reduction in total alcohol demand and in the loss of consumer satisfaction/surplus. Because other beverages are taxed on average at more than the excise rate on mid strength packaged, beer it also leads to an under-estimate of the increase in tax revenue to government.

To explore the extent of the conservative biases induced into our estimates by the failure to allow for substitution /cross price effects in the base version of the MJA alcohol simulation model, we have utilised the demand system model developed by Allen Consulting for FARE.

The Allen Consulting alcohol demand model has seven beverages but does not distinguish between different categories of consumers. Since the model is based on systems estimate of the response of demand to own and cross prices, it provides a full set of own and cross-price elasticities.

As expected, the increase in the price of wine leads to a major fall in the demand for wine, particularly cask wine (–50 per cent) and increased demand for beer (+4 per cent) and spirits (+2 per cent).

As a result of the ability to substitute, the loss of consumer surplus is also reduced very substantially. The across the board reduction in alcohol demand after cross-price substitution would be less than the change estimated using the (no cross price substitution) elasticities which are centred on Fogarty's (2010) meta estimates.

Since the reduction in the cost of HTO is assumed to be proportionate, the benefit of the reduced cost of HTO is correspondingly reduced.

Table H.4 compares the results of the two models for Policy Experiment 2, i.e., the abolition of the WET and its replacement by an alcohol excise at a rate of $29.05/LAL, equivalent to the excise rate for full-strength draught beer. To extend to the full analysis of benefits and costs, we have linked the MJA benefits module to the Allen Consulting model. For the reasons footnoted below, the numeric estimates differ but the qualitative results are essentially the same, i.e., there are substantial net benefits to the Australian economy from alcohol tax reform.[ii]

[ii]   Inspection of the models and their results indicates that the Allen Consulting model has an implied own price elasticity of –0.49 across all alcohol compared with –0.40 for the MJA/Fogarty elasticities. It is important to note that the Allen Consulting model has a point estimate of the own price elasticity of wine of –0.80. The lower overall effect reflects the replacement of some of wine consumption with other beverages.

     The critical difference revealed between the two models is, however, the magnitude of the price change for wine after the WET is replaced by an excise set at $29.05/LAL. Where our tops down analysis estimates an average (base weighted) increase in wine price of 16.8 per cent, the Allen Consulting model indicates an average price increase for wine of 34.0 per cent.

     To reconcile this gap, we inspected the Euromonitor data which allow an independent check and fine and relatively precise calculations of the average (base weighted) price increase for wine. The Euromonitor data indicate an average price increase for wine as a result of replacing the WET with an excise rate of $29.05 equivalent in 2007 slightly lower than our top down estimate of 16.8 per cent but well below the Allen Consulting estimate of 34 per cent.

     Against the benchmark provided by the Euromonitor data, this comparison suggests that in terms of the magnitude of the average price increase resulting from the replacement of the WET, the MJA model estimate is closer to the mark.

Table H.4: Comparison of outcomes under MJA and Allen Consulting models

	WET replaced		WET replaced and other excise +50%	
	MJA / Fogarty	**Allen Consulting**	**MJA / Fogarty**	**Allen Consulting**
	($ billion)			
Gross loss of consumer surplus	−1.04	−1.07	−3.70	−3.18
Transfer of consumer surplus to government	1.00	0.83	3.57	3.04
Loss of net consumer surplus	−0.04	−0.24	−0.13	−0.14
Loss of previously transferred tax	−0.06	0.02	−0.43	−0.45
NET change	−0.10	−0.22	−0.56	−0.59
Savings in cost of harms	0.33	0.76	0.82	1.13
NET BENEFIT	**0.23**	**0.54**	**0.25**	**0.54**
	(percentage change on base)			
Change in				
Prices	6.3%	12.9%	14.6%	22.4%
Consumption	−2.5%	−5.9%	−6.3%	−8.9%

Source: MJA analysis.