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The Cost of Cost Studies

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THE COST OF COST STUDIES

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Abstract: We review methods and assess the policy influence of a series of publicly-funded Cost of Illness studies, mostly published since 1990. Our analysis shows that headline cost estimates, including the influential paper by Collins and Lapsley (2008), depend on an incorrect procedure for incorporating real world imperfections in consumer information and rationality, producing a substantial over-estimate of costs. Other errors further inflate these estimates, resulting in headline costs that are unrelated to either total economic welfare or GDP and therefore of no policy relevance. Counting only external, policy-relevant costs not only deflates overall figures substantially but also results in rank order changes among cost categories. Despite this, Cost of Illness studies appear effective in mobilizing public opinion towards increased regulation and taxation that is not justified by an expected increase in economic welfare: this is the cost of cost studies.

Keywords: costs and benefits of alcohol usage, alcohol policy, Australia, New Zealand, adequacy of consultancy reports

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1. Introduction¹

If alcohol imposes social costs well in excess of the excise tax paid by drinkers, we might presume that an increase in taxes or regulation targeting the social costs of drinking would be consistent with economic efficiency: the social cost avoided by the tax increase or regulatory imposition would likely exceed the benefits forgone by drinkers consequent to the tax. “Cost of illness” (COI) studies (Collins & Lapsley 2002, 2008; *BERL* 2009; Rehm et al 2009 among many others) suggest alcohol’s social costs far exceed the excise tax collected.

We argue that the standard economic case for intervention, which relies on identifying instances in which the marginal social costs of consumption exceed marginal private costs, is not established by Cost of Illness studies. First, these studies summarily ignore the differences between marginal and total costs. Even were it the case that total external cost exceeded total collected taxes, feasible interventions including excise tax increases can remain undesirable where marginal external costs are less than the excise rate. Barker (2002) reminds us that linear excise taxes are at best imperfect mechanisms for dealing with rather large heterogeneity in external cost imposition. Second, Cost of Illness studies typically ignore or deliberately blur the distinction between internally and externally borne costs. These studies calculate social-cost figures that generally include a large proportion of costs falling on the drinker and on other parties more typically considered to be in contract with the drinker, which economists usually identify as private and not policy-relevant. We here mostly address problems arising from the conflation of private and social costs while noting the reasonably large problems also caused by the abandoning of marginal analysis.

In Section 2 we briefly outline the distinction between private and social costs in the economic literature. We review the types of costs that can give rise to inefficiency in standard welfare economics and discuss augmentations of that standard model to account for concerns raised in the behavioural economics literature. In Section 3 we review the Cost of Illness literature and contrast the standard economic model described in Section 2 with the Cost of Illness method. The policy conclusions drawn from COI studies are unsound; while policy conclusions can be drawn from external cost studies that employ standard economic method, the method of COI studies varies far too greatly from the more standard economic approach to allow the drawing of policy conclusions. Section 4 provides two case studies. Section 5 assesses the influence of cost of illness studies on policy debates. Section 6 concludes.

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2. Costs and Benefits in Neoclassical Welfare Economics

Economic measures of social cost are meaningful because of the method by which they are derived. Where other methods of cost tabulation are employed, the conclusions that can be drawn from findings of net social costs are very limited.

In the standard economic approach, choice reveals preference. If an individual purchases a product, he must judge the total benefits of that action as exceeding its total costs. He could *ex post* find himself to have erred, but his choice was rational *ex ante*. This holds for both market and non-market choices: an individual deciding to catch a ride with a friend rather than walk to work has judged that the chosen option has greater net benefits or smaller net costs for himself; if the friend agrees to give him the ride, he too must have determined that the benefits exceeded the costs.

When individual optimising agents meet and interact in efficient markets, outcomes are Pareto-Efficient. The First Theorem of Welfare Economics (see Varian, 1992, p. 326, for example) limits the scope of welfare enhancing public policy intervention to correction of market failures: internalizing external costs, ameliorating information asymmetries through information provision, and antitrust policy.²

Economists recognise that conditions required for the First Theorem do not hold in real world settings. Indeed, the Greenwald-Stiglitz theorem³ suggests that situations in which the conditions hold will be the exception rather than the norm. Deviations from blackboard ideals have been incorporated into basic neoclassical welfare economics using well-established methods. The failure of the real world to conform with the assumptions underlying the First Welfare Theorem do not justify abandoning the framework.

It is useful to define failure in consumption. As we discuss in section 4, it appears that a failure in consumer decision making is frequently defined in the alcohol social cost literature by noticing *ex post* strongly negative outcomes to which no rational person would choose to submit. But consumption decisions are made *ex ante*, and negative outcomes *ex post* are not sufficient to define failure in decision making. Consumers may rationally and with full knowledge choose to bear risk of a negative outcome in exchange for a compensating benefit. That occasionally the negative outcome occurs neither proves suboptimal decision-making has occurred nor justifies policy intervention. The correct test of failure in consumer decision making is to identify the behaviours consumers undertake that would not occur but for imperfections in rationality or information, and but for the presence of externalities.

Three potential market failures are relevant when tabulating the social costs of substance abuse. Most prominently, costs or benefits of individual actions falling on persons external to the deciding agent and not part of a contractual or quasi-contractual arrangement that internalise the external effect are defined as externalities and can give

² For summaries of the market failure literature, see Cowen (1988), *The Theory of Market Failure: A Critical Examination*, and Cowen and Crampton (2002), *Market Failure or Success: The New Debate*.

³ Greenwald, Bruce and Joseph E. Stiglitz (1986), "Externalities in economies with imperfect information and incomplete markets." *Quarterly Journal of Economics* 101: 229-264.

rise to inefficiency. In the presence of negative externalities, we typically expect that too much of an activity is undertaken at the margin relative to the optimum. Second, imperfect information can generate market failure. Finally, deviations away from rationality can yield significant departures from optimal choices. We will take each of these in turn.

2.1. Externalities

Since the Coasean revolution (Coase 1960), externality problems have been viewed as a function of either inadequately-specified property rights or of transactions costs. Either of these gives rise to a “missing market” such that a party imposing costs on others has little reason to count those costs in his optimisation; inefficiency results⁴. If a driver has a greater likelihood of being involved in a road accident while inebriated, he will weigh the increased risk of costs to himself but will pay less heed of costs he may impose on pedestrians when deciding whether to drive. There is no market in which either a pedestrian can pay the driver to stay off the road or the driver can pay pedestrians for assuming the increased risk of accident. Consequently, the inebriated driver imposes an external cost on pedestrians that can be measured identically by summing the product of the increased probability of accident imposed on each by the average cost of an accident, or by tallying the realised cost to pedestrians and sober drivers of drunk drivers.

But no missing market exists when affected and affecting parties are linked through a contractual or quasi-contractual nexus. Merger is a standard solution to inter-firm externality problems, unifying decision-making within a single agent that takes account of costs and benefits to the entity as a whole. Firms may err in choosing the production mix that maximises profits across the merged units, but such errors do not constitute a policy relevant market failure. Similarly, while a common assault on a stranger is an external cost borne by the victim, a boxing match is not a market failure: agreement internalises what would otherwise be external costs.

Similarly, intrafamily effects should generally be seen as having been internalised. While some intrafamily effects fall so far beyond the normal grounds of marriage contract that their costs can be deemed social – family violence, for example – counting all intrafamily decisions as socially relevant would lead to absurdities. If we count the drinker’s spending on alcohol as a cost to his family, what of the non-drinker’s spending on golf clubs? The Australian Treasury writes of economic costs:

These costs are more limited in scope than those used in the cost of illness methodologies that have been developed in the public health literature (for example, Collins & Lapsley 2008), which also include many of the costs that individuals bear themselves. To estimate spillover costs relevant for setting rates of tax, it is necessary to exclude private intangible costs (such as pain and suffering), and the loss of household production from premature death or sickness. That said, the distinction between private costs and spillover costs is not always clear. For example, if a family utility and decision making model is used, alcohol-related violence against family members and the loss of family

⁴ See, for example, Varian (2006, pp. 626-7); Boadway and Wildason (1984, pp. 61-2), among many others.

disposable income are private costs; but, if an individual utility and decision making model is used, costs borne by other family members are spillovers. (Australia's Future Tax System, Vol 2., p.435)

Coasean considerations lean heavily towards treating the family as a single unit for analysis, and could extend to deeming family violence as being internalised; we propose simply drawing the line such that the costs and benefits of legal activities occurring within families be counted as internalised by that family.⁵

Following Buchanan and Stubblebine (1962), externalities are only Pareto-relevant, and consequently only of interest for ameliorative policy, when they are technological rather than pecuniary and when the cost of abatement is less than the cost imposed: in other words, cases in which the outcome would differ if the missing market were to exist.

Fiscal externalities, described by Browning (1999) as a pecuniary externality running through the tax system, seem to drive much of the popular impetus for taxation of health-related behaviours. Take as a baseline the case in which individual alcohol consumption is invariant to whether health care costs are privately or publicly borne. In that case, fiscal externalities are a pure transfer. As a pecuniary externality, they are of no efficiency consequence (Buchanan and Stubblebine, 1962). But voters are not insensitive to pecuniary externalities (Holcombe and Sobel 2001). Consequently, alcohol excise taxes are set to defray this transfer cost. But because alcohol excise taxes cannot be adjusted to the drinker's individual circumstances while private health insurance premiums can be, the combination of public insurance and excise taxes is necessarily less efficient than private insurance and no excise taxes. Low and moderate drinkers will face the same marginal alcohol excise tax rate as heavy drinkers while incurring far lower, or negative, health risks; light drinkers will consume too little relative to the optimum while heavy drinkers will consume too much. The alcohol excise tax that perfectly recovers all alcohol-related health care expenditures remains distortionary (Barker, 2002).

Alcohol consumption does increase when the state defrays consequent health care costs. Klick (2006), for example, finds that state insurance mandates requiring that insurers provide coverage for alcoholism increased state alcoholism rates. The extent to which this behavioural response is inefficient depends largely on the relative elasticity of different cohorts of drinkers to public defraying of health care costs.

As a thought experiment, imagine that we move from the world without excise taxes and without public provision of alcohol-related health care services to the world in which

⁵ Further, Gary Becker's "Rotten Kid" theorem demonstrates that the existence of an altruistic "benefactor" member within a family is sufficient to induce family-regarding behaviour among other non-altruistic family members. Suppose that one child in the family is "rotten", having only regard for his own welfare and none for that of his parents or siblings. Even the rotten kid will refrain from harming the family's interest because the altruistic parent's bequest motive ensures internalization. The theory generalizes to any case where selfish family members interact with a member acting as altruistic benefactor.

The theorem breaks down in families without an effective altruist: where both spouses are "rotten" or where both parents and children are "rotten". But where there exists not even minimal altruism among family members, alcohol policy is not the appropriate solution; rather, family dissolution is most efficient. See Becker (1981).

alcohol-related health care services are fully funded by an alcohol excise tax set such that aggregate tax revenues match aggregate health expenditures. In the ex ante world, private insurers charged a fair premium to those drinkers consuming more than four drinks daily and efficient levels of alcohol consumption obtained. Ex post, moderate drinkers see an excise tax somewhat above their prior health care premium; heavy drinkers see a large price reduction.⁶ Consequently, moderate drinkers reduce consumption while heavy drinkers increase consumption.

Here, relative price elasticities and non-linearities in health costs begin to bite. Even if moderate drinkers reduced their consumption by as much as heavy drinkers increased their consumption, aggregate health costs would increase as moderate drinking confers health benefits while the health costs of heavy drinking rise quickly with increased consumption. While heavy drinkers experience a relatively larger price change, they are roughly sixty percent as price responsive as moderate drinkers (Wagenaar et al, 2009). The total tax required to cover the aggregate health costs of heavy drinking can exceed the aggregate health insurance premiums that would have been collected in the ex ante world; the ability to externalise fiscal health costs then yields a real inefficiency rather than simply a pecuniary externality. However, this real inefficiency will be small relative to the overall alcohol excise tax take as consumption is relatively inelastic.

The primary social costs of alcohol use, in an economic framework, will consist of those costs that drinkers impose directly on external parties. The bulk of costs accruing to the public health system are properly viewed as a transfer – a pecuniary externality without efficiency consequence. True inefficiencies resulting from consumption distortions when health costs are subsidised can either be accrued as costs of harmful alcohol use or as costs of subsidising risk-taking behaviours through the public health system. We nevertheless count transfer costs imposed through the health system as an external cost of alcohol use. Internally borne costs only count as socially relevant in the presence of other market failures.

2.2. Information and rationality failures

Imperfect information about the costs or benefits of alcohol consumption could yield sub- or supra-optimal consumption relative to the consumer's ideal point. The deadweight costs of such errors – the excess of gross costs over gross benefits for the excess portion of consumption – can be viewed as a social cost. But information itself can be costly: if the deadweight costs avoided by information acquisition are outweighed by the costs of acquiring that information, the consumer will have erred overall even if he then consumes the ideal amount of alcohol. Further, consumption of most goods, including alcohol, is a “repeated game”; we should expect learning to moderate the frequency and severity (though not eliminate) mistakes in consumption decisions. Where policymakers believe that imperfect information causes harm, the correct market intervention is subsidisation of information provision such that consumers acquire the desired amount of information. If consumer behaviour persists despite the provision of the information necessary for

⁶ The high insurance costs that previously fell on a small group of heavy drinkers are spread more evenly across all drinkers.

informed choice and other market failures are not present, economists typically conclude that the choice was optimal even if disfavoured by policymakers.⁷

In the last twenty years, attention has been increasingly paid in the economic literature to apparent failures by consumers to optimise behaviour in some circumstances. This is the focus of the comparatively new field of behavioural economics, which has demonstrated persistent deviations in consumer behaviour from the theoretical ideals which underpin revealed preference and consequently the first welfare theorem.

The social cost of alcohol literature frequently asserts imperfections in consumer rationality as a source of failure in consumption decisions, but without defining the term ‘rationality’. The implied view is that there is a failure among consumers to maximise health, but this definition of irrationality does not exclude the possibility of rational maximisation of some other objective. Sen (2002, pp. 39-40) draws out the distinction between maximisation and maximand using the (we trust) hypothetical example of a man cutting off his toes with a blunt knife. Can rationality be defined without reference to preferences, however bizarre? Sen says no: an assessment of rationality requires examination of the goal as well. The distinction is important: we suspect the social cost of alcohol literature might be less influential if an express definition of rationality revealed that the basis for the majority of alcohol-related costs in this literature was simply that consumers behave so as to maximise objectives other than those that health researchers would prefer. We will henceforth use the term “healthist” to refer to the implied view common in the alcohol social cost literature that maximization of health outcomes is the only allowable goal in consumer choice.⁸

Related to imperfections in rationality is ‘internalities’, which considers time inconsistency in decision making. The field of behavioural economics has developed in response to dissatisfaction with traditional explanations of consumer behaviour. Gruber (2002) says that motivation for the development of the concept of internalities is from noticing the disconnection among smokers between their desire to quit smoking and their unwillingness to actually quit. This implies hyperbolic discounting and time inconsistency of preferences: “tomorrow’s self” is more patient than today’s and would like “today’s self” to commit to quitting smoking. According to Gruber, public policy can operate as a commitment device to move consumers to their preferred consumption: tax increases on cigarettes, for example, can raise consumer welfare because taxes are an effective commitment device that cannot be privately organised.

The concept of internalities is behind the ‘nudge’ principle of Sunstein and Thaler (2008): choice of default settings in public policy can move people toward desirable consumption decisions without using coercion if individuals retain the freedom to opt away from the default option. The economic theory on which the idea of the nudge is

⁷ A second-best case for taxation can be made where information uptake is very costly for consumers. If irrationally incurred internal consumption costs were more elastic to tax measures than to information provision, and if the marginal harm of tax measures on moderate drinkers were low, excise could be preferable. Again, and as always, analysis at the margin is required to determine whether any policy passes cost benefit analysis.

⁸ Crampton, Eric. 2009. “Public health and the new paternalism”, *Policy* (Spring).

based is strongly contested (Gul and Pesendorfer, 2008). Hyperbolic discounting provides the basis for many purported behavioural biases: individuals will too-heavily weigh the present relative to the near or distant future. Some researchers label such behaviour as irrational.⁹ But while laboratory evidence exists for hyperbolic discounting in particular settings, Anderson et al (2010) find no evidence of substantial hyperbolically discounting behaviour in a field experiment involving a wide sample of adult Danes. Findings of hyperbolic discounting may be fragile to choice of experimental subjects and laboratory settings. Levitt and List (2007) similarly urge caution in extrapolating from economic laboratory results to real world settings.

Furthermore, if irrationalities plague individual decision makers, what reason have we to believe that policy makers are isolated from similar problems? Individuals may make errors, and policy choices may help them to avoid those errors, but biases in voter perceptions are certainly not unknown either (Caplan, 2001b; Crampton 2009, among many others). Berggren (2011) notes that less than five percent of articles in behavioural economics that advance policy recommendations pay any attention to whether behavioural anomalies also may be present in political decision-making.

In the case in which failures of rationality result in excess alcohol consumption, it can be proper to count the deadweight costs of the excess portion of consumption as being socially relevant. But without a benchmark for rational consumption, it is impossible to make such quantification. As will be discussed in Section 4, the alcohol cost literature squares the circle by assuming that all consumption by a drinker who is deemed to be irrational or to lack sufficient information is of zero gross benefit; where full and perfect information is deemed a condition of rational choice, this is hardly an adequate basis for cost assessment. Further, setting excise taxes to internalise costs that are already internal to the drinker seems unlikely to prove beneficial. The irrational drinker who is price insensitive will simply incur higher personal costs while providing a transfer to the government; the irrational drinker who is price sensitive will not enjoy benefits unless the avoided self-imposed cost is greater than his increased tax burden.

That imperfections in consumer behaviour exist and are of interest and relevance to policy setting is not in question. Whether public policy, accounting for government imperfections and failure, is capable of producing benefits sufficient to justify their cost and improve efficiency are not addressed here. For our purposes it is sufficient to note that imperfections in rationality, information, and the existence of externalities and internalities may be incorporated into the welfare analysis of consumer purchasing and consumption of alcohol.

⁹ Rizzo and Whitman (2007) survey the literature asserting policy consequence of irrational hyperbolic discounting. Note that Rasmusen (2008) and Farmer and Geanakoplos (2009) warn that hyperbolic discounting can be consistent with rationality.

3. Literature Review

Since the 1970s, many studies have used economic methods to estimate the costs of alcohol consumption or abuse to society. Precisely what these studies have attempted to estimate has varied. Some studies have attempted to estimate the external costs of alcohol abuse,¹⁰ but the majority has taken a “cost of illness” (COI) approach to measuring costs.¹¹ The COI approach to measuring the cost of alcohol consumption and abuse is borrowed from earlier studies that estimated the costs of other illnesses and drug abuse (Rice, 1967). Generally speaking, COI studies attempt to estimate the gross direct and indirect costs to society of alcohol consumption or abuse.¹² Under the broad COI umbrella, though, there is considerable diversity in method and results.

The first generation of COI studies follow Rice in understanding social cost as costs accruing to drinkers themselves (private costs) as well as the costs imposed on unwilling third parties (external costs), with no distinction made between these two categories.¹³ This COI method, which Robson and Single (1995) refer to as the “US-PHS” approach, was systematized by a 1979 taskforce (Hodgson & Meiners, 1979). The purpose of these studies was to estimate the gross costs to society of alcohol use or abuse above the costs of producing the alcoholic beverage itself. Without any examination of offsetting benefits or drawing distinction between externalities and private costs, these studies offered no justification for government intervention in alcohol consumption. These studies were instead justified as setting priorities and acting as a basis for cost-benefit analysis (Harwood, 1991; Rice, 2000).

A new approach to estimating the social costs of alcohol abuse, also labelled COI, was pioneered by Collins and Lapsley (1991) and systemized by a series of working groups beginning in 1994 which culminated in Single et al (2003), *International guidelines for estimating the costs of substance abuse*. Collins and Lapsley modified the gross cost method in three major ways. The first major modification was to introduce express consideration of private costs to their analysis and then to label their resulting estimates

¹⁰ Heien & Pittman, 1993; Laslett et al., 2010; Manning, Keeler, & Newhouse, 1991. The New Zealand Treasury’s estimate (Barker, 2002) focused on external costs of alcohol consumption, which were found to approximate the aggregate alcohol excise tax take.

¹¹ Adrian, 1988; Baird, Lanctot, & Clough, 2004; Barkey, 2009; Berry & Boland, 1977; Cabinet Office, 2003; Chung, Chun, & Lee, 2006; D. J. Collins & Lapsley, 1991, 1996, 2002, 2008; Cruze, Harwood, Kristiansen, J. J. Collins, & Jones, 1981; Devlin, Scuffham, & Bunt, 1997; Easton, 1997; Fenoglio, Parel, & Kopp, 2003; FGS McClure Watters & York Health Economics Consortium, 2010; Harwood, Fountain, & Livermore, 1998, 2000; Johansson et al., 2006; Lima & Esquerdo, 2003; Liu, 2002; McDonnell & Maynard, 1985; McDowell Group, 2005; Montarat et al., 2010; Nakamura, Tanaka, & Takano, 1993; Parker, Shultz, Gertz, Berkelman, & Remington, 1987; Rehm et al., 2007; Rice, 1993; Rice, Kelman, & L. Miller, 1991; Rice, Kelman, L. Miller, & Dunmeyer, 1990; Roeber, 2009; Rosen, T. R. Miller, & Simon, 2008; Saar, 2009; Salomaa, 1995; Single, Robson, Xie, & Rehm, 1998; Slack, Nana, Webster, Stokes, & Wu, 2009; Varney & Guest, 2002; Whelan, Josephson, & Holcombe, 2008; Xie, Rehm, Single, Robson, & Paul, 1998; York Health Economics Consortium, 2010.

¹² In the COI literature, the term abuse is generally defined by consumption in excess of medically recommended limits.

¹³ Cruze et al., 1981; Nakamura et al., 1993; Rice 1993; Rice et al., 1990, 1991.

net cost. By deducting private costs from gross costs, the Collins and Lapsley definition of net cost resembled, in theory if not in practice, what economists call social cost, i.e. total costs in excess of private benefits, or policy-relevant consumption externalities.

While this approach seemingly has greater policy relevance than the first generation of COI studies, it can be misleading: the exclusion of private costs by Collins and Lapsley is nominal. Collins and Lapsley (1991, p. 48) define private as “costs knowingly and freely borne by the consumer or producer” and social cost as “all other costs either not knowingly or not knowingly and freely borne by the consumer or producer”. In later iterations of their method Collins and Lapsley further narrowed the definition of private cost to include only those costs in which consumers are fully informed, consistently rational and who bear the entire cost of their consumption (Collins and Lapsley 2008, p. 9). Collins and Lapsley (2008, p.9) hold that, “[o]nly if all three conditions are simultaneously satisfied will the resultant costs be private costs.” This is a definition of private cost that has the effect of eliminating virtually all private cost, substantially increasing the share of costs defined as social cost, as will be discussed at length in Section 4.

The second significant innovation by Collins and Lapsley was the inclusion of the costs of producing alcohol as social cost where that production was for that part of alcohol consumption that is abusive. This counting of production costs as social cost was a product of following a too-narrow definition of private costs to its logical conclusion. A third innovation by Collins and Lapsley was to include measures of intangible costs such as pain and suffering, with others following (Cabinet Office, 2003; Easton, 1997; Johansson et al., 2006; Rosen et al., 2008; Salomaa, 1995; *BERL*, 2009; York Health Economics Consortium, 2010).

Net cost as defined by Collins and Lapsley is neither gross total costs nor external costs, yet it is this definition that was adopted by the Single et al *Guidelines*¹⁴ and has subsequently been used by a number of COI studies.¹⁵ The Single et al *Guidelines* were designed to provide a general framework for estimating the social costs of substance abuse in order to increase comparability, but the advice offered leaves room for interpretation and confusion. Some have understood the Guidelines to be interested in only external costs in the normal economic sense.¹⁶ Even the authors of the Guidelines seem to differ in their interpretation. While Collins and Lapsley see social cost as being the net cost to society not offset by private benefits, Single and co-authors in their study of Canada state they are following the earlier version of the Single et al Guidelines in defining social costs as “the sum of the private and external costs after adjusting for transfers within society” (Single et al., 1998, p. 992). It is perhaps not surprising to observe wide variation in social cost estimates and misinterpretations of findings by media and politicians. Moreover, even those agreeing on the basic definition of social cost often disagree about the precise categories that should be included. For example,

¹⁴ Single et al., 2003, pp. 8-10

¹⁵ Easton, 1997; *BERL*, 2009, among many others.

¹⁶ For example, Rehm et al., 2006, p. 14.

Collins and Lapsley include the resources expended in the production of abusively consumed alcoholic beverages, but this method has not been generally followed.¹⁷

There are a number of problems in the means used to estimate actual costs which generally lead to inflated social cost figures. The largest cost component in most COI studies is productivity losses due to premature mortality and morbidity. As the Single et al (2003, pp. 38-42) guidelines recognise, these costs are difficult to estimate. Many studies – such as Rehm et al (2007), Rice et al (1991), and Rosen et al (2008) – simply take the difference between the average earnings of the general population and alcohol abusers as an indication of the lost productivity due to alcohol abuse. However, this approach grossly exaggerates productivity costs, first by unrealistically assuming that alcohol abusers would be just as productive as non-abusers but for their alcohol abuse, second by ignoring replacement of missing workers and thus (unrealistically) assuming an economy at full capacity.¹⁸ Further, distinction between private and policy-relevant external cost would need to be accounted for.

Many of these costs are only partly attributable to alcohol abuse. Health problems are caused by many factors; counting any illness for which alcohol is a contributing factor as wholly attributable to alcohol abuse inflates figures. As such, most COI studies take estimates of the proportion of illness attributable to alcohol to get a better indication of the true costs of alcohol abuse (Single et al., 2003, pp. 37-38). The Single et al (2003, p. 42) guidelines recommend a similar approach to crime, pointing out that merely being under the influence of drugs or alcohol does not tell us whether the crime would not have been committed if the perpetrator had been sober. This advice has not generally been heeded. Varney and Guest (2002), for example, simply take the proportion of perpetrators who tested positive for alcohol when committing some crime as the fraction attributable to alcohol. While that study could perhaps be forgiven, having been released prior to the Single et al guidelines, Collins & Lapsley, who coauthored the Single et al 2003 guidelines, similarly use demonstrably non-causal measures of alcohol-related crime.¹⁹

Transfers such as welfare payments and theft are generally (and correctly) excluded from measures of social cost since they reflect a shift in resources rather than a net cost to society. Only one COI study we are aware of, Salomaa (1995), counts welfare payments as a social cost. Distinguishing marginal from inframarginal effects is problematic. Intangible costs such as pain and suffering are also generally excluded from the standard COI approach due to the difficulty of measuring these costs.

Social cost estimates are frequently compared to GDP. The comparison is spurious for several reasons. GDP is a measure of value added, whereas COI definitions of social cost are largely a totting up of costs, with offsetting economic benefits (and thus value) mostly ignored by assumption. Social cost estimates generally include items not counted in GDP, such as household work and intangible costs. Further, comparisons of stock measures of

¹⁷ The only other COI studies of which we are aware including the cost of consuming or producing alcoholic beverage are Easton, 1997; Chung et al., 2006; and BERL, 2009.

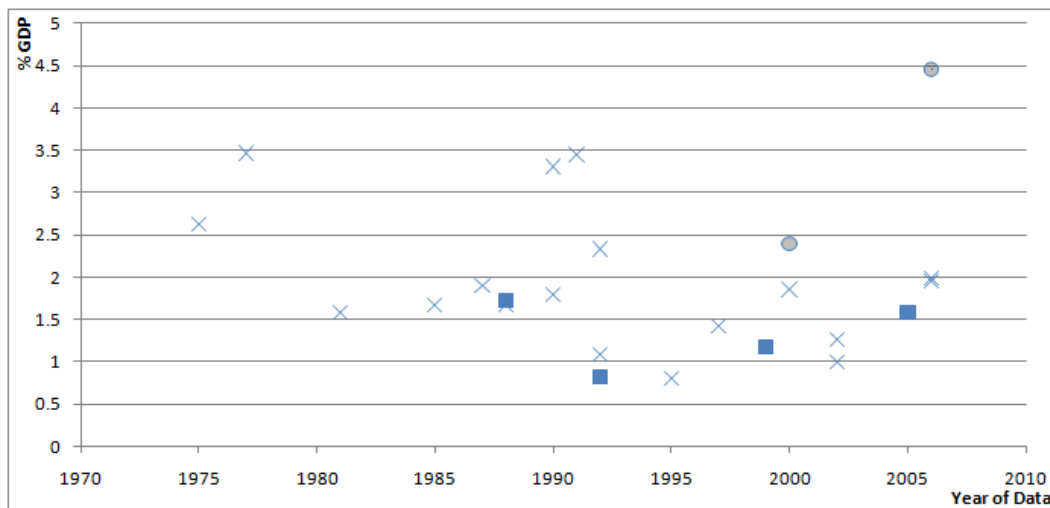
¹⁸ See Moller and Matic, 2010.

¹⁹ See Section 4, below.

social cost with flow measures of GDP can be misleading. For example, studies which calculate the value of lives lost due to alcohol abuse may then spuriously compare the value of years of life lost, a stock, to annual GDP, a flow, when the two measures are incommensurable. Most studies admit these problems when comparing their headline figures to GDP, but media coverage and political debate tends to overlook these subtleties.

The innovations of Collins and Lapsley did not necessarily work to produce larger social cost figures. Compared to the US-PHS COI studies, the inclusion of resource costs of consumption and the exclusion of the private costs of non-abusive consumption roughly cancel each other out. Collins and Lapsley's results do not differ sharply from earlier COI studies. Figure 1 graphs the reported social cost of alcohol as a percentage of GDP for those 25 COI studies at the national level. This shows that the headline values reported by Collins and Lapsley, represented by solid squares, are consistent with the findings of other COI studies.

Figure 1: COI Social cost of alcohol estimates as percent of GDP²⁰



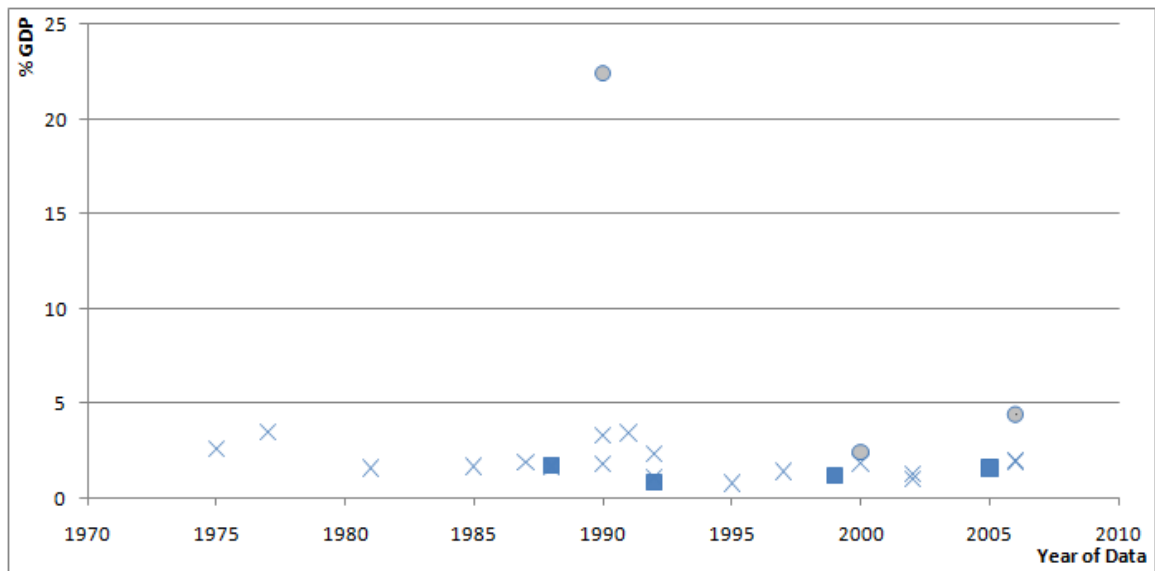
The problem with this new method, however, was that it could more easily be used as a basis for policy, since it is explicitly – and, we will argue, mistakenly – assumed that these are costs not offset by private benefits. Moreover, the Collins and Lapsley method is extremely sensitive to the definition of abusive consumption. When the resource costs of alcoholic beverages are included in the calculation, a small loosening of the definition of abuse can produce enormous increases in the headline social cost figure. Those studies following Collins and Lapsley in including the cost of beverage are shown as shaded circles in Figure 1.²¹ Two of these studies, both from New Zealand, have arrived at very large estimates. Easton (1997), not shown in Figure 1 to avoid unduly extending the vertical axis, provides an estimate about an order of magnitude higher on a per capita

²⁰ Social cost measures are not usefully compared to GDP, as noted elsewhere. However, large figures relative to GDP may build support for regulatory or tax measures restricting alcohol use.

²¹ Easton 1997; Chung et al., 2006; BERL, 2009.

basis than the average found in other studies. *BERL* (2009) produce a number which is much larger than other social cost studies other than Easton (1997), by considering half of all alcohol consumption abusive, among other unusual method decisions detailed as case study in Section 4, below. Figure 2, below, places the Easton (1997) result among the other figures.

Figure 2: Social cost figures as percent of GDP including Easton (1997)



4. Antipodean lessons: The Social Costs of Alcohol in Australia and New Zealand

In the previous section we examined the proliferation of studies presenting cost of illness (COI) estimates for alcohol as measures of costs to society. In Australia and New Zealand, COI studies have figured prominently in alcohol legal reform, helping to build public support for greater controls on alcohol. We now examine two recent examples of these studies: Collins and Lapsley (2008) and *BERL* (2009). The COI method underlying both studies causes their calculated cost estimates to be irrelevant for policy analysis. The majority of costs are properly considered internal, and those costs properly considered external are, at best, imperfectly measured. While the figures produced by the COI method are meaningless from an economic and policy perspective, they are rather large, appear authoritative, and consequently influence policy. We begin with Collins and Lapsley's 2008 examination of the social costs of alcohol in Australia before considering *BERL*'s derivative application in New Zealand.

4.1. Collins & Lapsley (2008)

Collins and Lapsley (2008, henceforth CL) argue that alcohol imposed a net cost on Australians of \$15,318,200,000 in the 2004-2005 fiscal year, consisting of \$1.7 billion in spending on alcohol, \$1.4 billion in crime costs, \$2 billion in net health costs, \$3.6 billion in lost workplace production, \$1.6 billion in lost home production and \$2.2 billion in road accidents, as well as intangible costs of \$4.5 billion from loss of life, pain and suffering; costs jointly attributable to alcohol and other drug use total an additional billion dollars.²²

CL's method requires that abusive consumption provide no offsetting benefit to the consumer. This assumption of the non-existence of private consumption benefit produces the majority of headline costs in CL and is without foundation or support. If offsetting benefits exist, then private costs borne by the heavy drinker including lost wages, lost productivity, poor health, increased mortality, road accident costs accruing to the drinker and lost home production must be weighed against consumption benefits and are properly accounted a private rather than a social cost.

Given the CL definition, a private cost without offsetting benefits becomes socially relevant: an arithmetically defensible position. However, the existence of potential failures of consumer information or of rationality is sufficient for CL to entirely discount private benefits of "abusive" consumption; the method is without support in the economic literature.

Headline figures in CL mostly depend on the presumed -existence of private benefits from consumption of alcohol among harmful drinkers. Extraordinary claims require extraordinary evidence; the burden of proof is on those who make this claim. Collins and Lapsley provide no supporting evidence, and little detail beyond the potential for failures

²² Table 33, p. 64. From this total they deduct \$1.6 billion in consumption resources saved through premature mortality. We would discount this as generally constituting an intrafamily transfer through the estate rather than a real benefit.

of information or of rationality, to explain why consumers who derive zero gross benefit from consumption of alcohol, according to CL, continue to purchase it in quantity. Other substantial problems in CL's estimates are of second-order importance relative to their complete discounting of any private benefit from either what they deem addictive consumption or from consumption that leads to adverse consequence.

4.1.1. Private and Social Costs

Private costs are properly excluded from measures of policy relevant social cost as they are generally offset by private consumption benefits of magnitude at least as great as those privately borne costs. Findings of net costs then generally imply costs imposed on third parties. Confusingly, CL do not use the term 'net costs' to refer to the excess of costs over benefits, including consumption benefits; instead CL refer to the total cost of alcohol use net of any health benefits which flow from moderate alcohol consumption. Consumption benefits other than those relevant to health are arbitrarily excluded by the CL method.

In CL, two classes of consumers do not enjoy consumption benefits from alcohol. First, addicted drinkers, who consume, by "educated guess", some thirty percent of alcohol consumed in Australia. CL warn this could be an underestimate. Consequently thirty percent of total alcohol expenditure in Australia – some \$1.7 billion dollars per annum, is tallied as a private cost with no offsetting benefit: a social cost. Second, CL argue that any drinker who is imperfectly informed about alcohol's potentially deleterious effects cannot be viewed as an informed consumer; CL inexplicably assert this justifies the elimination of all private consumption benefits for consumers suffering or imposing any adverse consequence of alcohol consumption. While we argue in Section 2, above, that weighing the deadweight costs of excess consumption resulting from information or rationality failures may be justifiable, assuming all consumption to provide only deadweight cost is not. Consumer enjoyment forms the bulk of the economic benefit consumers receive from the consumption of alcohol; counting these benefits as zero allows CL to convert private but potentially unanticipated costs of alcohol consumption into policy-relevant social costs.

Even were we to abandon mainstream welfare economics by deeming all imperfectly informed consumption as generating only cost, we still could not conclude that alcohol use imposed particular harm unless failures in information were greater for alcohol use than for average alternative consumption goods. Every consumption decision made by each and every consumer, always and everywhere, for every product, is characterized by imperfect information. It would be an interesting exercise to derive welfare conditions under the assumption that consumption under imperfect information cannot provide consumption benefits.

This elimination of benefits for both "addicted" and imperfectly informed consumers is responsible for most of the CL headline cost figure but is both implausible and without foundation in economics. A measure of social costs has no policy implications if that measure is not based on sound economic method: standard welfare economics allows us to conclude that Pigouvian solutions may be useful when action imposes high social cost; if the social cost estimate is derived outside of the method of standard welfare economics, it cannot draw on welfare economics for its policy implications.

The omission of alcohol's non-health consumption benefits from the CL estimate provides important context for the "net" cost figure produced. Pointed at virtually any activity, an application of the CL method which counts costs but ignores most or all benefits would find large net costs. Where individuals voluntarily bear risk in exchange for consumption benefits, counting the costs of the relatively few tragedies without weighing the consumption benefits enjoyed by the majority of consumers gives no indication of value. CL correctly assert that limits on consumer knowledge and rationality means they are unable to correctly anticipate an activity's costs, but then incorrectly argue this justifies eliminating nearly all benefits from the analysis. This is plainly non-sequitur. We explain in section 2 how economists incorporate real world imperfections in consumer rationality and information into consumer welfare analysis.

By eliminating most of an activity's benefits, CL ceases to be a test of any hypothesis; it is trivially the sum of an activity's production, distribution and consumption costs, net of a small and arbitrary collection of benefits. The CL measure is unrelated in any systematic way to an activity's contribution to welfare (its value to society, or efficiency) or its contribution, positive or negative, to GDP. Policy makers can therefore have no use for it. The repeated use of the CL estimate by politicians in support of policy suggests they have misunderstood the CL headline figure to be a measure of contribution to GDP or to social welfare. It is not.

By way of analogy, consider the case of skiing. Every skier bears risk; a very small proportion of skiers are killed. If we were to consider the net costs of those skiers involved in a serious accident, we would be right, to a first approximation, to ignore the benefits of skiing for those victims of accidents, since any benefits would be trivially small relative to the magnitude of the costs they incurred. However, it would be wrong to conclude from this examination of victims that skiing imposed massive net social costs. No estimate of any activity's value, and no policy implications, can be derived from an assessment limited to the downside risk of an activity. The benefits of alcohol consumption enjoyed by those drinkers who *ex ante* consumed as much alcohol must be weighed against the harms borne by those who become alcoholics or suffered another adverse consequence. Only in this way is it possible to make economically meaningful statements about net costs, whether of alcohol consumption or of any other activity.

4.1.2. Incorporating consumer imperfections

Alcoholics may wish that they had never touched alcohol. Analytically, this argues for an excess of private costs over private benefits: for these drinkers; their consumption of alcohol exceeded, perhaps by some margin, an optimum. The difference between the cost and benefit may be labeled regret, but regret does not imply the non-existence of benefits. Consider an alcoholic who consumes ten standard drinks per day on average and who, by assumption, would be happier if he could consume zero drinks per day, but who would be happier still if he could consume no more than four standard drinks per day were he able to stop after the fourth drink. In this example, the first four drinks consumed provide benefits in excess of their costs. The latter six drinks consumed provide costs in excess of their benefits. The excess costs of the latter six drinks in the example outweigh the benefits of the first four, leading the drinker to wish he consumed no drinks at all. CL err in counting the entire amount consumed as representing pure cost; costs net of benefits

will be rather less than gross costs. It does not follow that if for some drinkers the costs of drinking outweigh benefits, there are no benefits.

CL err in deeming all alcoholics' expenditures on alcohol a social cost rather than a private cost. If total private costs to the alcoholic exceeded private benefits, net cost is relevant in a total cost-benefit analysis, and would be correctly weighed against the benefits enjoyed by moderate drinkers who took similar risks of developing alcoholism. Policy is not informed by an economic cost measure that counts only downside costs and excludes upside benefits.

4.1.3. Mistreatment of rationality, information

The central role assigned to rationality in CL goes back at least to Single, Collins et al (2003), who suggest that while private costs falling on the individual consumer typically ought not to be counted in cost estimation studies, these costs can only be discounted where we expect there to be offsetting private benefits. Single, Collins et al correctly acknowledge that for rational consumers, personal costs cannot exceed personal benefits and so private costs are not social costs. But what is necessary to establish private benefits in excess of costs? According to Single, Collins et al (p. 21):

Thus, if the costs of substance use are to be classified as private costs, the following three conditions must be simultaneously satisfied:

- 1. The users are fully informed as to the costs which the substance use imposes upon themselves;*
- 2. The users are required to bear the full (internal and external) costs of the consumption; and*
- 3. The users make rational consumption decisions in the light of all the information available to them.*

These requirements are extremely stringent, so stringent in fact that the conventional approach of treating all abuse costs as social costs is fully justified.

CL follow a similar approach, arguing that if consumers are not fully informed, consistently rational, and required to bear the full costs of their consumption, the "resultant costs" are social.²³ CL concede the weakness of rationality as a test, noting in effect the impossibility of separating rational optimisation of different objectives from irrationality, and falling back to a position that "society is clearly unwilling to accept all behaviour patterns" (p. 10).

Despite the central role assigned to rationality and full information in the CL method, neither term is formally defined. The test for private costs defined by Single, Collins et al is unknown to the economics literature, and for good reason: the stringent nature of the

²³ See page 9. CL further argue, "Being fully informed about the private costs of abuse requires the abuser to have access to, and have the ability to process and evaluate, epidemiological information on the effects of drug use. It also requires the drug user to be able to evaluate the probable future health and other costs resulting from the drug use. It is difficult to believe that drug users, by their nature, are fully-informed, or even well-informed, about the costs of their abuse." Contrast Collins and Lapsley, here, with Lundborg and Lindgren's 2002 finding that youths overestimate the probability of developing alcoholism.

test for private cost renders it trivial. Consumer imperfections in information and rationality must be presumed everywhere, and so the Single, Collins et al private cost definition must convert the private costs of all goods to social costs. By converting private costs to social, the implied view is that even minor imperfections in consumer rationality or information eliminate all private consumption benefits. This is the cornerstone assumption of the CL method.

In short, the literature following Single, Collins et al. incorrectly considers the First Welfare Theorem as consisting of necessary rather than of sufficient conditions for optimality, then assumes that any deviation from those conditions justifies treating all individual choice as completely in error. This does not merely stray widely from established theory; rather, it is a position that calls us to discard modern welfare theory. It is a position best argued and formally proved in the literature on market failure and welfare economics before being assumed in a consultancy report.

The First Fundamental Theorem of Welfare Economics outlines conditions sufficient for market efficiency. If one or more of the assumptions underlying the theorem fail, government action may correct market failure. Efficient outcomes can be achieved even when the theorem's axioms fail to obtain. The theorem assumes, for example, an infinite number of infinitesimally small trading agents, none of whom can affect prices. While this clearly fails to hold in the real world, and fails even more strongly in laboratory environments with small numbers of traders, traders in experimental double auction environments nevertheless often find the efficient solution.²⁴

The Greenwald-Stiglitz theorem suggests market failure will be pervasive because problems of information asymmetry are ubiquitous; despite the welfare theorem's conditions being sufficient rather than necessary, markets may well typically fail to exhibit perfect blackboard efficiency. While it would be surprising if alcohol markets were immune to such failures, it does not follow from the existence of imperfections that all private costs are made social. Even if the First Welfare Theorem stated necessary rather than sufficient conditions for an efficient equilibrium and one of those conditions failed to obtain, that would only tell us that interventions designed to address the specific failure may be justified and that some deadweight loss would be present as consequence of the failure.²⁵

Information failures and self-control problems may lead to greater than optimal consumption and may consequently result in net or excess costs associated with the erroneous increment of consumption. Such failures result in incurring of costs in excess of benefits at the margin, and not the elimination of all benefits.

²⁴ Vernon Smith summarizes the literature in his Nobel lecture, "Constructivist and Ecological Rationality in Economics", *American Economic Review* (2003). See discussion at p.475.

²⁵ Consider the absurdity by analogy to physics. Earth's gravity provides an accelerative force of 9.8 meters per second squared; an object in a vacuum if dropped will accelerate at that rate. We would err grievously if we then concluded that deviations in acceleration under gravity due to air resistance on earth meant gravity could be ignored entirely. CL effectively assume as much when asserting that the existence of market failures transforms all private alcohol abuse costs into social costs.

CL engage in sophistry when arguing that when consumers are less than fully informed or less than consistently rational, the resultant costs are social. If “resultant costs” meant the excess of total costs over total benefits for those units of production erroneously consumed, the method would be defensible. But it is not what CL have done. Instead, they have counted as pure cost the total amount that addicted consumers spend on alcohol and have added to that all of the experienced downside costs of those suffering adverse consequences from alcohol consumption while weighing none of the private benefits. CL’s treatment of all abuse costs as social only can be supported in the case in which the optimal quantity of consumption was really zero. In that case and that case alone is the increment of excess consumption equal to total consumption.

The expansive approach in counting private costs as social is methodologically unsound but allows CL to assume away an otherwise intractable problem: setting a threshold level of rational consumption. Sound method would require estimating what portion of consumption was erroneously consumed as consequence of particular failures of information or rationality and the excess of private cost over private benefit for that portion of consumption. But how can we tell for any drinker whether his sixth drink was rationally or irrationally consumed?

It is tempting to use an epidemiological standard based on levels of consumption that are consistent with harms to health (see *BERL*, 2009, discussed below). However, rational individuals can and do choose to trade off health maximization against other goals. Common experience suggests health and life expectancy are constantly traded off against other worthy goals of enjoyment, experience and life quality consistent with a rational expression of preferences. An epidemiological consumption threshold does not test rationality unless it can be established that individuals have selected health as their only goal; in that case, we would also have cause to worry about underconsumption by teetotalers.

4.1.4. Rational Addiction

A subset of abusive consumers of alcohol are addicted. Becker and Murphy (1988) define addiction as rational if consumption maximises forward-looking utility under stable preferences. A good is potentially addictive in the Becker-Murphy framework if there is complementarity between past and current consumption. Becker-Murphy predict that if addiction is rational, addicts will respond to permanent future price increases by reducing consumption today. Becker, Murphy and Grossman (1994), among others, find evidence consistent with rational addiction.

None of the discussion in the previous section demands that abusive consumption, let alone addiction, be rational. Even where consumption is irrational and produces undesired consequences, the consumption remains of some positive value and the analysis above holds. CL dismiss Becker and Murphy 1988 by arguing that the Becker-Murphy model has unrealistic axiomatic assumptions including rationality and information, and so it cannot hold in the real world.²⁶ However, at least since Friedman

²⁶ CL argue further at page 10 that “A high proportion of addictions are acquired in the early- or mid-teens when it would seem that the presence of both rationality and full information is unlikely.” They present no

(1956), the economics profession has tended to focus on whether a model accurately predicts real world behaviour than on whether its assumptions perfectly reflect reality. The specific predictions of the model regarding addicted consumers' responses to expected future price changes bear out in the real world.

The rational addiction model does not presume addicted drinkers are rational. Instead it describes what rational, fully informed consumers would do when faced with addictive consumption choices and subsequently in response to price changes. Becker and Murphy show that addictive consumption is not incompatible with fully informed and fully rational decision-making. A series of empirical studies largely confirm their model. Consequently, evidence of addiction, let alone the much lower threshold of consumption in excess of an epidemiological threshold, is an insufficient basis to conclude that the consumption is irrational.

The CL objection to rational addiction is misguided in other ways. First, it is common ground among economists that consumers make mistakes in reasoning: empirical estimates of the rational addiction model only find about 75% of consumer behaviour is consistent with rational addiction (see Murphy 2009). Second, differences of opinion regarding the existence and degree of rationality among consumers are second order: it is the incorrect incorporation of irrationality into a model of welfare by CL that is mainly responsible for the inflation of their headline figure and its disconnection with any policy-relevant economic statistic. Third, CL do not consider how abandoning rationality in measuring the cost of abusive consumption has consequences for consumer responses to policy. Fourth, if consumption is irrational then economic measures including cost cease to have meaning.²⁷

CL follow the COI method recommended by Single, Collins et al that deems a broad assortment of private costs as having no offsetting benefit due to information or rationality-based market failures and consequently being of policy interest. This method is inconsistent with mainstream economic understanding of the distinction between private and social cost and of mainstream market failure theory. Even if it were established that consumption were irrational, it does not follow that the private (gross, not net) benefit of consumption is zero and all private costs, including the production of alcohol, are made social. The alleged market failures are without strong foundation, but even if granted, could justify inclusion of only a small percentage of the social cost claimed by CL.

evidence for the claim. And what evidence we have runs contrary. Lundborg and Lindgren (2002) find that people on average *overestimate* the likelihood of becoming an alcoholic and that youths in particular overestimate that likelihood.

²⁷ Gul and Pesendorfer (2008) remind us that the “use of welfare analysis *requires* the standard definition of economic welfare” where the standard definition of welfare depends on choices made by presumably largely rational consumers. Outside of that framework, we have little basis for welfare comparisons across policy or world states. See also Seamus Hogan, “A word after the final word on rationality,” available from <http://offsettingbehaviour.blogspot.com/2009/07/word-after-final-word-on-rationality.html> (accessed 15 June 2011). In the world in which individuals cannot reliably identify costs or benefits of their actions, cost-benefit analyses are ultimately futile; every market will be out of equilibrium and no price will represent marginal cost or marginal utility.

Private costs form a high proportion of Collins and Lapsley's tabulated social costs of alcohol use. In the following sections we consider the main cost components estimated by CL as they move from most plausibly private to most plausibly social. While we provide indicative figures suggesting the proportion of Collins & Lapsley's cited figures that could potentially represent actual social costs, the derived figures are not a reliable measure of the social costs of alcohol in Australia.²⁸ Instead, they are only suggestive of what CL might have found had they followed a more standard method in conducting their assessment.

4.1.5. Resources used in abusive consumption

It is difficult to consider the amount heavy drinkers spend on their alcohol as an external policy relevant cost. CL include some \$1.7 billion they assume is spent by heavy drinkers as a social cost of alcohol. Some fraction of this figure could be considered as socially relevant where a portion of consumption was made in error, whether due to addiction or to imperfect information about the health risks of alcohol. But the figure provided has no such basis. Instead, they cite prior work (CL 1996) as having concluded that twenty percent of alcohol consumption was by addicted drinkers and consequently was without offsetting benefit; they add, as an "educated guess" and without empirical support beyond that some others say the fraction is higher, that an additional ten percent of consumed alcohol is also without value because it is consumed by people who go on to suffer or inflict adverse consequences. As these estimates are of no small importance to the headline cost estimate in CL, consider the support for the finding that twenty percent of alcohol is consumed for no benefit, as reported in Collins and Lapsley (1996):

The 1993 National Drug Strategy household survey found that 10% of alcohol drinkers consumed alcohol every day. All addicted consumers of alcohol could be expected to consume alcohol every day, although not all daily drinkers will be addicted. It can be expected that addicted drinkers will on average consume a very high amount of alcohol compared with the rest of the alcohol consuming population. On the basis of this analysis it was concluded that 20% of alcohol consumption was by addicted consumers.

This estimate was supported by advice from drug experts with qualifications in medicine, epidemiology and behavioural sciences." (found at 3.(h))

Collins and Lapsley (1996) is the only support for CL's contention that some thirty percent of alcohol is consumed without benefit by addicts. We would expect the most important empirical assumption in CL to be better supported. *BERL* (2009), discussed below, provide a similarly robust basis for their measure of harmful consumption.

Including the entire amount is invalid unless it is the case that there is zero gross private benefit from any amount of that alcohol consumption. It is plausible that many addicted drinkers would wish to drink less; it is implausible that they receive zero gross benefit from any portion of their consumption. In the absence of detailed work showing the proportion of addictive consumption that imposes costs on the drinker not only in excess of benefits for those extramarginal units but also of sufficient magnitude to outweigh consumer surplus enjoyed on prior units of consumption, the best approach is to consider

²⁸ Crime costs in particular are imperfectly measured.

this an internal rather than an external cost of alcohol consumption, and therefore policy irrelevant.²⁹

4.1.6. Intangible costs

Loss of life due to premature mortality contributes \$4.1 billion in annual intangible cost, including \$565 million loss of life costs accruing to road accidents; pain and suffering due to road accidents totals an additional \$0.4 billion. Where the loss of life or accident cost accrues to the drinker himself, the cost is best viewed as internal. Costs imposed on victims of alcohol-related crime including victims of drink drivers external to the driver's vehicle are rightly deemed external and policy-relevant.

But even in the case of drink driving, where we would expect the greatest proportion of external harms, the vast majority of cost accrues to the driver himself and to passengers within his vehicle. American data suggests over eighty percent of drink driving fatalities involve those within the drink-driver's vehicle.³⁰ Counting only the minority of total intangible costs falling on parties properly considered external reduces total intangible costs from \$4.5 billion to \$184 million.³¹

We worry that CL's inclusion of intangible costs from loss of life constitutes double counting where value of forgone production is counted as a tangible cost of premature mortality. CL's value of a lost life year, \$53,267, is derived from the Australian Bureau of Transport Economics' (2000) estimation of the valuation of a statistical life; that measure is based on estimates from willingness-to-pay measures.³² But surely one's willingness to pay for incremental safety improvements, the basis for such value-of-statistical-life measures, incorporates not only the intangible costs of death but also the forgone enjoyment of consumption that would come with forgone wages.

²⁹ Defenders of COI method have alleged that the suggested approach presumes perfect rationality and/or information (for example see BERL's defence of their study "BERL rejects criticism of study," available from: <http://www.berl.co.nz/1026a1.page>, accessed 21 June 2011). It does not. We presume only that where consumption is to excess, causing costs in excess of benefits at the margin, those excess costs are on average offset by benefits in excess of costs from the first few drinks. This, we argue, is a better approximation than to presume zero gross benefits for any drinking, including the first few, by an abusive drinker. This approach plainly does not depend on perfect rationality and/or information, since in the example drinking is, by assumption, to excess. We require only that gross benefits exist against which excess costs can be offset.

³⁰ Stringham and Moore (2009) cite NHSTA data showing 83% of drink driving related fatalities accrue to individuals within the drink-driver's vehicle.

³¹ An alternative accounting which would count the costs accruing to the drink driver's passengers but not to the drink driver himself is potentially defensible, though it would need to overcome the strong presumption of a contractual nexus linking driver and passenger. While we have statistics sufficient for estimating the proportion of victims external to the vehicle, we do not know the proportion consisting of drink drivers. As the total cost associated with drink driving loss of life is just over half a billion dollars, even including all such victims' costs as policy relevant would have only moderate effects on the overall cost figure tabulated.

³² While the Bureau of Transport's crash cost accounting uses a fatality value derived from a human capital approach, they also list what they deem a plausible VSL value based on willingness-to-pay measures; it is this latter figure that CL use.

Consequently, and as will be discussed in greater depth below, measures of forgone production will only include those costs not already counted in measures of external intangible costs of lives lost.

4.1.7. Productivity and absenteeism

Lost earnings due to premature mortality, premature retirement and absenteeism are costs that accrue primarily to the drinker but constitute over \$3.5 billion of CL's headline social costs. While CL argue that employees shift costs onto the employer, making those costs external, the argument fails. Employer and employee are bound by a contractual nexus; the worker's reduced productivity is internal to his relationship with his employer. A less productive employee is less likely to receive future promotions and salary increases; he bears the burden of his reduced productivity. Firms that fail to detect worker productivity and promote workers beyond their worth will eventually go under.

Measurement concerns are relevant. The method used by CL to assess excess absenteeism may be unsound due to uncontrolled confounding. CL compare the number of absences from work for drinkers and non-drinkers, presumably controlling for age and sex. But if it is the case that the employee who calls in sick due to a hangover is more likely to be irresponsible on other unmeasured margins, then comparing the mean absenteeism rate difference between the two groups and attributing the entire difference to excess alcohol use seems rather too quick. Equally plausible would then be that the kinds of employees who call in sick due to hangovers are also the kinds of employees who call in sick for other discretionary reasons. But we cannot conclude this without more detail of CL's method than they provide.

Further, there remains the "alcohol-income puzzle": Auld (2005) finds that moderate drinkers earn ten percent more than abstainers while heavy drinkers earn twelve percent more than abstainers.³³ If drinkers on average impose high costs on employers, it seems odd that employers should choose to pay them more than teetotalers.

Only where workforce reduction and absenteeism are imposed on a third party by a drinker, as would be the case when a drink driver kills someone outside the vehicle, could we consider the cost of lost earnings as an external cost – primarily borne by the family of the harmed party rather than by his employer. And in those cases, as noted above, if the intangible costs of lives lost have already been counted, including forgone production constitutes double-counting where workers earn their marginal product.

Similarly, the \$1.6 billion in forgone household production due to premature mortality and illness can only count as external when the costs are borne by an external third party; this would be a very small proportion of the cost figure. But even leaving that aside, the measure seems dubious. CL follow the Australian Bureau of Statistics (ABS) estimate of individual function replacement cost: they tally the time individuals spend on all forms of household production, then estimate the cost of hiring someone at hourly rates to perform each of those tasks. The ABS found that it would have cost an amount equivalent to

³³ Auld controls for potential endogeneity and a host of potential confounding factors, finding that the alcohol-income puzzle remains even subsequent to such controls. See also Chatterji and DeSimone (2006), who find that binge drinking in high school correlates with higher wages in adulthood.

roughly half of Australian GDP to hire workers to perform all the tasks typically conducted within households.³⁴ But many household production tasks cease to be of any value at all if the performer of those tasks suffers premature mortality; we need not hire a chef to replace the cooking duties performed by a regrettably deceased bachelor. Further, the fact that tasks were performed within the household rather than outsourced to the market suggests that the household was not willing to pay the market rate for that service's production; pricing at market replacement cost may overestimate the value of the service performed. And, finally, the measure will already have been included in the value of the statistical life lost.

Collins and Lapsley net from this measure the value of consumption resources freed for others' use with a premature death: the "value of national resources which would have been consumed had the drug-attributable death not occurred." They provide no hint as to the workings underlying their figure of \$1.6 billion in consumption released for the use of others. Collins and Lapsley (1991) note the following:

"In estimating the tangible costs of mortality we have subtracted consumption from production to indicate the net tangible resources removed from the rest of society (including the deceased) as a result of the drug abuse death. It is generally agreed in the literature (see, for example, Motha 1990) that, if the viewpoint of the study were that of the whole community, it is not appropriate to subtract consumption from production. We accept this analysis and accommodate it within our framework of tangible and intangible costs.

Had the prematurely dead been still alive they would have been consuming a certain value of goods and services. A minimum value of these goods and services is indicated by their market value since had the prematurely dead not valued them, as a minimum, market prices they would not have been willing to pay these prices. The market value of consumption forgone by the deceased presents a minimum estimate of the benefit of forgone consumption."(p. 60, 1991)

In the 2008 study, CL weigh \$1.6 billion in forgone consumption against \$3.2 billion in forgone production due to premature mortality. This presents a bit of a puzzle: what happens to the half of a worker's product not consumed by a deceased worker? If the country were populated exclusively by households with a single earner, and consumption were split equally across couples, and if only the earning member of the household ever died prematurely due to alcohol use, forgone consumption totaling roughly half of forgone production would make sense. But that does not describe Australia in 2004/5.

We must turn to the construction of the "forgone production" figure to resolve the discrepancy. CL write:

To estimate the workforce impact of drug abuse on costs as defined here, the size of the actual workforce in the financial year 2004/05 is compared with the workforce size estimated on the assumption that there had been no past or present abuse of the drug in question. An estimate is then made, from national accounts data, of the difference in potential production levels between the actual workforce and the counterfactual, no drug abuse, workforce. (p. 24)

³⁴ Australian Bureau of Statistics. 1997. "Unpaid Work and the Australian Economy".

Collins and Lapsley effectively take a measure of per capita GDP and multiply it by missing workers to tally the cost of forgone production.

We do not agree with the approach that takes forgone production as constituting a relevant external cost. If workers are paid their marginal product, production losses are entirely internalized. Further, worker and employee are linked by contractual nexus that internalizes effects. Finally, forgone tax revenues to the government will be matched by reduced expenditures on superannuation and other benefits; only in the case where deceased drinkers are disproportionately drawn from the segment of the population contributing more in taxation than they consume in services costly at the margin could a plausible case be based on forgone net tax revenues.

But even were this cost not internalized by contract between workers and employers or by that workers are paid their marginal product, such a measure may overestimate even gross production costs if there remains any potential that employers can replace a missing worker with either another worker or a more capital-intensive production process. Without endorsing the approach taken, we note that the WHO's current "Best Practice" guidelines (Moller and Matic, 2010) warn that even those inclined to take forgone production as an external cost overestimate those costs:

By the late 1990s, it was becoming clear that the human capital method was based on a highly dubious assumption: that a society is characterized by full employment, such that people who die are absolutely irreplaceable in the labour market (Koopmanschap, 1998; Maynard, Godfrey & Hardman, 1994). This assumption is a clear overstatement as it is more likely that some of the working people who die prematurely are replaced by people who otherwise would have been unemployed. If we go so far as to assume that everyone in the workforce who died prematurely would be replaced, then the only cost is the friction cost of replacing workers, which primarily consists of the time it takes to recruit a new worker (Koopmanschap et al., 1995). Several studies have compared the human capital and friction cost methods, finding that the friction cost is often just 1–3% of the human capital estimate (Danish Ministry of Health, 1999; Rehm et al., 2006) and thereby demonstrating just how important such assumptions are.³⁵

The human capital approach noted takes the present discounted value of expected future earnings in a counterfactual; Collins and Lapsley's method, the demographic approach, counts the annual flow of forgone earnings against a counterfactual population including those deceased in this and prior years. But the frictional method clearly remains a fraction rather than a multiple of annual forgone wages. Moller and Matic go on to recommend some measure between frictional costs and forgone wages; forgone GDP per capita is well beyond Moller and Matic's upper bound. Even within the framework to which we raise objection, per capita GDP as production cost of forgone workers, socially borne, requires rather strong assumptions regarding worker irreplaceability. Our figures rely on the external rather than the internal critique.

Finally, we need account for that the bulk of the costs of forgone production will already have been accounted for in the intangible value of statistical lives lost. The Australian Bureau of Transport Economics' value of a statistical life (VSL), which CL use to derive

³⁵ Moller and Matic, 2010, p. 32.

their cost of a life-year lost, is based on willingness to pay for incremental safety improvements. This leads to two absurdities. First, VSL measures are derived on the basis of individuals' willingness to bear risk. Going on to count as public cost the value of lives lost by those who have chosen to accept those risks does some violence to the method on which VSL measures are based: if individuals are irrational in their assessment of risk and unable to make informed choices about health risks, the method used to value statistical lives is also unsound. If the measure is sound but the costs are deemed public, we need a theory allowing us to claim that individuals' assessments of risks on margins other than alcohol are informed and sound while those relating to alcohol are irrational. Second, and more critically, we cannot simultaneously count the costs of forgone production borne by the drinker and the value of statistical life years lost by drinkers as the latter value will encompass the former.

We consequently modify the CL figure rather substantially. For both drinkers suffering consequences of long term alcoholism and those who are the tragic victims of drink drivers, workers earning their marginal product see no losses in production beyond those already accounted for in measures of value of life lost. The remaining external cost not already here counted is the frictional cost imposed on employers by workforce reduction and absenteeism. We use the CL estimate of forgone consumption as the true measure of lost wages: \$1.61 billion; CL's measure of \$3.21 billion in forgone production requires that workers earn substantially less than their marginal product. Ten percent of that measure of forgone earnings is a maximal plausible estimate of costs drinkers may impose on employers that are not already accounted for via wage differentials: \$161 million.

If the wage component of forgone production due to absenteeism follows that due to reduction in workforce and workers are paid their marginal product, forgone wages due to absenteeism are \$184.6 million - some 50.2% of CL's measure of forgone production. We take ten percent of that figure as a maximum plausible upper bound on the frictional costs that can be imposed on an employer that are not incorporated into wages: \$18.5 million. The measure of total net labour cost consequently drops from \$3.5 billion to \$179.6 million.

4.1.8. Road accident costs

Road crash costs not already tallied form the next largest plausible external cost of alcohol abuse. Drink drivers impose large, real, and tragic costs on others. However, we confess some puzzlement over CL's figures. At Table 31, "Drug-attributable road accident costs", CL list \$2.2b in tangible costs of road accidents but only \$1.33b are deemed not elsewhere included; at Table 33 which sums all the tangible social costs of drug abuse, tangible road accident costs not elsewhere included are listed as \$2.2b. We suspect that CL carried over the incorrect line from their spreadsheets as other measures otherwise become irreconcilable.³⁶ We here work from costs tallied in Table 31 and which we expect to constitute those not elsewhere included.³⁷

³⁶ CL write: "It should be noted that, in the overall output tables presented later, some of the road accident cost components above are included in other broader cost categories (for example, health or productivity).

If we continue to assume that some twenty percent of road accident victims are external to the drink driver's vehicle, then we can allocate approximately twenty percent of property damage costs of \$821.6m, and of lost quality of life due to injuries of \$353.6m, as being external and policy relevant, along with the totality of travel delay, insurance administration, and policing costs. Road accident costs not elsewhere included then total \$740 million rather than \$1.68 billion.

But we question CL's determination of alcohol attributable accidents. Data from the Australian Institute of Criminology suggests that a very high proportion of those arrested for drink-driving had other drugs in their systems when blood testing was conducted. Aggregate statistics are not there presented, but details by policing region are instructive. 67% of males arrested in Adelaide for drink driving tested positive for cannabis use, in Brisbane, 56%.³⁸ While drivers under the influence of marijuana alone are less likely to be involved in car accidents than are those under the influence of alcohol alone, the combination of alcohol and marijuana seems particularly noxious: the marijuana user's impairment is combined with the alcohol user's overconfidence.³⁹

Recall that the aetiologic attributable fraction denotes the proportion of deaths among those exposed to the risk factor that are attributable to the factor in question. The alcohol attributable aetiologic fraction for alcoholic liver cirrhosis is 1.0 – all alcoholic liver cirrhosis is held to be due to alcohol consumption⁴⁰. But CL's aetiologic attributable fraction for illicit drug-caused deaths through road accidents for males does not exceed 0.055 for males in any age category while reaching 0.394 for alcohol for males aged 20 to 50. Collins and Lapsley attribute almost forty percent of all male road accident deaths in particular age categories to alcohol and only some five percent to other drugs despite that pluralities and often majorities of those arrested for drink-driving are also found to be under the influence of other drugs. Attributing causality when an impaired driver had consumed multiple substances that separately and in combination would affect driving ability would be rather difficult. But the attribution seems disproportionate. A reasonable proportion of the \$740 million we here accrue to alcohol could as plausibly be attributed to other drug consumption.

The totals above which are designated "n.e.i." are the ones carried over to the aggregate tables." (p. 61). However, Table 31 includes \$1,329.6 million in tangible costs not included elsewhere; Table 33 lists those costs as \$2,202.0 million, the amount listed in Table 31 as total tangible costs.

³⁷ CL do not list which Table 31 costs are not elsewhere included. We square the measures by deeming not elsewhere included \$821.6 million in vehicle costs; \$496.8 million in travel delays and other general costs; \$353.6 million in lost quality of life due to accidents; \$10.6 million in costs of long term care and \$0.6 million for premature funerals; our total n.e.i. then matches CL's.

³⁸ Australian Institute of Criminology. "Drug use monitoring in Australia: 2005 annual report on drug use among police detainees."

³⁹ UK Department for Transport (2000) reviews the literature, finding that the impairment effect of alcohol is greater than cannabis but "the combined effect of both drugs was greater than any single drug alone."

⁴⁰ Hepatitis C can also result in liver cirrhosis; presumably the aetiological fractions used have accurately separated hepatitis-related cirrhosis from alcohol-related cirrhosis.

4.1.9. Crime costs

Alcohol-related crime provides the most plausible source of truly external social costs. Collins and Lapsley argue alcohol-related crime costs reach over \$1.4 billion. While they present the figures as a lower bound on possible costs, there are strong reasons to believe them to be overestimates.

Almost a quarter of tallied crime costs consist of prisoners' forgone earnings. Had an individual not been arrested for alcohol-related crime, he could have been part of the workforce. Such losses, in an economic costing, are properly viewed as internally borne by the prisoner and consequently not social in nature. Further, if the assessment of prisoners' productivity is conditioned only on age and sex, the measure will strongly overestimate prisoner earnings; labour market characteristics of the incarcerated generally are rather worse than those not incarcerated, even prior to incarceration.⁴¹ We assess forgone prisoner earnings as being entirely internal to the drinker.

The largest component of crime costs involve police expenditures estimated at some three quarters of a billion dollars. These costs are estimated from surveys of those detained by police and published in their annual report, "Drug Use Monitoring in Australia" (DUMA, henceforth). Those detained in police stations are asked whether they have had five or more (three or more for women) drinks on the same day in the last twelve months. A standard drink is ten grams of alcohol, so the consumption threshold is under three Imperial pints of beer for a man and less than two pints for a woman; it is then unsurprising that in the 2005 survey used by Collins and Lapsley, 70% of men and 66% of women agreed that they had consumed at least that much on one occasion in the past year. Those answering yes were then asked if they had consumed that much alcohol any time during the last thirty days; 56% of men and 50% of women agreed. Then, those answering yes were asked whether they had consumed *any* alcohol at all in the last 48 hours – 44% of men and 32% of women.⁴² Finally, arrestees in this group were asked six questions assessing alcohol dependence: "yes" answers to three or more questions indicated alcohol dependence.⁴³

Collins and Lapsley's alcohol-attributable policing and court cost fractions derive from the proportion of police detainees who reported having consumed any alcohol at all in the

⁴¹ Giles and Le (2007) find that only 18% of a sample of Western Australian prisoners were employed in high skilled occupations and only 44% of those in the labour force were employed four weeks prior to incarceration despite overall employment rates of 93%. Assuming prisoners would have had labour force characteristics identical to the population average but for alcohol-induced incarceration seems mildly heroic.

⁴² Seventy percent of this final group also tested positive for other drug use.

⁴³ Milner, Mouzos and Makkai, 2004. The six questions are ("during the past 12 months" is included in each question):

"Have you spent more time drinking alcohol or using drugs than intended?"

"Have you neglected some of your usual responsibilities because of using alcohol or drugs?"

"Have you wanted to cut down on your drinking alcohol or drug use?"

"Has anyone objected to your drinking alcohol or drug use?"

"Have you frequently found yourself thinking about drinking alcohol or using drugs?"

"Have you used alcohol or drugs to relieve feelings such as unhappiness, anger or boredom?"

prior 48 hours and who answered “yes” to three or more of the questions listed in the footnote below. This is clearly inadequate for assessing causality. Consider a couple arrested together. They had shared a bottle of wine (eight standard drinks, of which he consumed five) one evening two weeks earlier and had each had a glass of wine with dinner before going out to rob a jewelry store. If they agreed that they wanted to cut down their drinking, that they frequently found themselves thinking about drinking alcohol, and that someone had objected to their drinking in the past year, the jewelry heist would be an alcohol-attributed crime for assessing the proportion of policing costs for which alcohol is to blame. Conversely, someone who smashed up shop windows the first time he consumed alcohol and whose offending was entirely due to alcohol would likely fail to answer “yes” to three or more of the alcohol dependence survey questions.

Prison costs are assessed by a different survey, the “Drug Use Careers of Offenders”, or DUCO. Here, prisoner self-reports of intoxication at the time of offending are used rather than simply whether the offender had consumed any alcohol in the forty-eight hours prior to arrest. Twenty-one percent reported being drunk on alcohol alone at the time of their offending (17% drunk and high). Ten percent reported alcohol (a further 8% alcohol and other drugs) as being responsible for their offending. This was adjusted downwards somewhat in models that accounted for “drug related – other”, to get the combined effects of intoxication and addiction. Then, 9% is blamed on alcohol and a further 12% on alcohol and other drugs in combination. The increase in the latter would reflect the increase in property crime to finance drug habits for folks with multiple addictions.

But all of this is self-report by prisoners asked to attribute blame for their offending. Roughly half of those who reported having been intoxicated by only alcohol at the time of their offending reported alcohol to be to blame for their offending. Would half of all crimes committed by people who are drunk really disappear in the absence of alcohol? For many, alcohol use will be incidental to the offence and blaming alcohol may be exculpatory.

Further, slightly less than a quarter of the sample consisted of non-regular offenders – people who are not career criminals. Over a quarter were regular property offenders, 15% regular multiple offenders, 8% regular violent offenders, 8% regular fraud offenders. 7% were drug traffickers and 7% drug buyers. It is easy to imagine the habitual career property offender who gives up drinking and is able to turn his life around and stop offending. But could half of them who blame alcohol do so? And, more importantly, is it alcohol that is then fundamentally causal or underlying personality traits that give rise both to alcohol abuse and criminal activity?

Non-regular offenders were most likely to blame alcohol for their offending (as opposed to other drugs), which would be consistent either with their having done something impulsive while drunk or with their unfamiliarity with the justice system and expecting exculpatory treatment for having blamed alcohol. It would be this group of non-regular offenders whose offending would be most likely to be sensitive to alcohol consumption. But that group comprises less than a quarter of the prison population and roughly half of even that group have had prior offences.

We agree entirely with CL when they write:

“only those crime costs should be estimated where a causal connection can be demonstrated between the consumption of a drug and the commission of a crime. A mere association between the two is insufficient. To confuse association with causation would result in a vast overestimate of the costs of drug-attributable crime.”(p.41)

Unfortunately, it is difficult to view their method as coming close to finding causal relationships. Proper design would measure the elasticity of criminal activity with respect to exogenous changes in alcohol consumption. But, studies that properly address causality find limited effects of alcohol on crime. Carpenter (2007) shows that a zero percent blood alcohol driving limit applied to 18-20 year olds in the United States reduced heavy alcohol use among that age group by some thirteen percent but the proportion of property crime attributable to 18-20 year olds dropped only by 3.4 percent and the proportion of violent crime attributable to that group did not change. As violent crime has higher social cost than property crime, the elasticity of overall crime costs to drinking seems limited.

If we assume that Carpenter’s elasticity estimates apply to the population as a whole, a ten percent reduction in property crime would require a thirty-eight percent reduction in heavy alcohol use. The one hundred and thirty seven percent increase in alcohol prices required to achieve that reduction would reduce moderate drinkers’ consumption by sixty percent, with consequent reductions in consumer surplus and health benefits of moderate drinking.⁴⁴ And it seems unlikely that adult property crime rates are as elastic to alcohol consumption as are youths’. Alcohol excise taxes are therefore a poor and indirect way of achieving crime reduction.

While we revise downwards to zero the estimate of social costs due to forgone prisoner earnings, we leave unchanged the other elements of the CL figure despite our serious misgivings about the proportion of crimes in which alcohol’s role was causal.

4.1.10. Health costs

While moderate alcohol use reduces all-source mortality (Castelnuovo and Donati, 2006), health costs are increasing with heavy alcohol use. If health care were provided privately with actuarial rates assessed based on individual alcohol consumption, incurred health costs falling on the drinker would best be deemed private; those falling on external parties such as the victims of drunk drivers would count as external. No private health expenditures other than those borne by external parties would then count as a social cost of alcohol.

With a public health system, most health care costs are best viewed as a transfer to those incurring health problems from those paying taxes. Transfers are not social costs as they are without efficiency consequence, but it may be desirable on equity grounds that alcohol excise taxes are able to meet the burden drinkers impose on the health system.

⁴⁴ Carpenter’s implied elasticity of property crime with respect to heavy alcohol consumption among youths is -0.26. Heavy drinkers’ price elasticity of alcohol consumption is -0.28; moderate drinkers’ price elasticity of alcohol consumption is -0.44 (Wagenaar et al, 2009).

The healthcare costs tabulated by CL, which account for reductions in costs attributable to moderate alcohol consumption, apply alcohol-attributable aetiological fractions to total medical and hospital expenditures in Australia. CL cite *Health expenditure Australia 2004-05* (Table A1) as source of total health expenditures. However, only sixty-eight percent of total health expenditure there tabulated derives from federal, state and local government expenditures; the remaining thirty-two percent is covered by private health insurance, individual payments, and other insurance schemes. If the mix of private and public spending on health care is evenly distributed across sickness categories, roughly a third of CL's tabulated hospital and medical costs must be excluded as internally borne through drinkers' insurance premiums.

We also worry that the aetiological fractions used may not account adequately for comorbidity between alcohol use and pre-existing mental disorders. The aetiological fractions used ascribe between twenty-five and thirty percent of male suicides to alcohol; in other words, if alcohol disappeared, the suicide rate would drop by more than a quarter for adult males over the age of twenty. As alcohol use can often be a form of self-medication among those with mental illness, whether alcohol plays that substantial a causal role in suicides is debatable. Ross (1995) finds that more than half of those with an alcohol disorder have a lifetime comorbid psychiatric disorder. Among subcategories for which data is presented, alcohol abusers have rates of mood disorders and anxiety disorders 2.3 and 1.7 times that of non-abusers. While 9% of alcohol abusers report antisocial personality disorders, only 0.6% of non abusers report such disorders. The Mental Illness Fellowship of Australia (2005) notes that those with bipolar disorder are eleven times more likely to engage in harmful drug or alcohol use than is the general population. Kessler et al (1997) find that those with long term alcohol abuse or dependence not only have a high probability of also exhibiting another mental disorder but also that comorbid DSM-III-R disorders tend to predate alcohol use disorders.

Perhaps more importantly, Collins and Lapsley understate the number of conditions for which alcohol reduces overall health costs. CL list alcohol as potentially reducing the risk of ischaemic heart disease, cholelithiasis, heart failure, stroke and hypertension. The Dietary Guidelines for Americans Advisory Committee's 2010 report provides an extensive list of conditions not included in CL's Table 58 detailing conditions affected by alcohol use. Alcohol increases the risk of colon cancer among those consuming more than two standard drinks per day: the single medical-cost-augmenting effect of alcohol not included by Collins and Lapsley. But moderate alcohol use of one to three drinks per day also reduces the risk of Type II diabetes by a half to a third relative to abstainers. Heavy drinkers experience higher diabetes risk relative to moderate drinkers, with an increase in risk of the same order of magnitude as the decreased risk enjoyed by moderate drinkers over abstainers.⁴⁵ Moderate drinking reduces the incidence of dementia and Alzheimer's;⁴⁶ low levels of alcohol consumption on the order of half to one standard drink per day also reduces the risk of hip fracture. We cannot quantify the reduction in net aggregate health costs that would result from inclusion of these factors, but reduced

⁴⁵ Report of the DGAC on the Dietary Guidelines for Americans, 2010, D7-3.

⁴⁶ DGAC, p. D7-9.

risk of diabetes seems likely to provide a substantial cost saving where dialysis treatment is generally rather expensive.

Further, because moderate alcohol consumption reduces health costs relative to abstinence, we must take extreme care in policy recommendations that seek to reduce the health care burden associated with alcohol use by reducing the availability of alcohol or by increasing its price. Castelnuovo and Donati's (2006) metastudy⁴⁷ found that individuals consuming about a standard drink per day enjoyed a fourteen percent reduction in risk of all-source mortality experienced by abstainers; drinkers did not experience risks above those experienced by abstainers unless they consumed more than four drinks per day (two for women). Work by Holahan et al (2010) suggests much larger beneficial effects for older persons, with moderate drinkers' risk of all source mortality being half of that experienced by abstainers and heavy drinkers' risk being *slightly lower* than that of abstainers.

CL report that recent revisions to alcohol aetiological fractions have increased the net estimated burden of alcohol use; "this is due to the previous study underestimating the number of people who abstain from alcohol or drink less than 0.25 drinks per day."⁴⁸ Because prior numbers had *overestimated* the number of moderate drinkers relative to abstainers, those prior numbers *underestimated* net health costs associated with alcohol use. If the number of teetotalers increases relative to the number of moderate drinkers, net health costs of alcohol use increase. As moderate drinkers are more price elastic than heavy drinkers,⁴⁹ the net effect on aggregate health costs of excise tax increases are ambiguous. Policies that induce older persons to switch to abstinence from moderate drinking substantially increase their risk of Alzheimers, dementia, and mortality. Tax instruments cannot avoid these kinds of collateral damage.

We cannot determine the proportion of nursing home or pharmaceutical costs tallied by CL that are borne privately. If any substantial portion is funded privately, the total would need to be reduced proportionately. Failure to account for alcohol's protective effect against Alzheimer's and dementia will lead CL's estimates to overstate the effect of alcohol on nursing home costs. Without access to their background figures, we cannot quantify the effect.

We reduce CL's assessed medical and hospital costs to account for the portion funded privately; total health costs then reduce from \$2 billion to \$1.6 billion. But the figure remains an overestimate absent better accounting for disorders ameliorated by moderate alcohol consumption.

⁴⁷ Note that Castelnuovo and Donati carefully sort between estimates that exclude former drinkers from the ranks of abstainers; reported results are for the curve that excludes such confounding.

⁴⁸ Australian Burden of Disease report, Begg et. al, p. 84, cited by CL at p. 39.

⁴⁹ Wagenaar et al, 2009. Where the price elasticity of demand for alcohol for all drinkers is -0.44, it is only -0.28 for heavy drinkers. So a price increase that induces heavy drinkers to reduce their consumption by ten percent would cause moderate drinkers to reduce their consumption by more than fifteen percent.

4.1.11. Summary

Collins and Lapsley argue that alcohol imposes social costs of over \$15 billion on the Australian public. Media and politicians alike interpret this figure as representing real costs borne by innocent bystanders: taxpayers and victims of crime. To a first approximation, at most only \$3.8 billion of the headline figure can count as costs borne by such external parties. We further expect the true figure would be lower if properly causal studies of the effect of alcohol on crime rates were used rather than surveys of detainee drinking habits. Policing costs of three quarters of a billion dollars hinge on whether alcohol can causally be attributed to offending where the offender has had a drink on the day of offending and has had a drinking problem. If the proportion of private funding for nursing home and pharmaceutical costs are proportionate to private funding of hospital and medical costs, a further \$230 million would be deducted from aggregate social costs. Adequate accounting of the health benefits of moderate drinking on relatively expensive conditions like Type II Diabetes would further reduce reported health care costs of harmful alcohol use.

Single's (2009) article, "Why we should still estimate the costs of substance abuse even if we needn't pay undue attention to the bottom line", concludes that cost studies are helpful for developing priorities for intervention. But if intervention is most justified when working to solve market failures rather than minimise some notion of aggregate cost that pays little heed to benefits enjoyed, social cost studies following the Collins and Lapsley modified COI method are not helpful. If priorities are assessed in order of aggregate cost, CL's ordering begins with loss of life (\$4.1 billion), followed by labour costs (\$3.5 billion), road accidents (\$2.6 billion), healthcare (\$2 billion), spending on alcohol (\$1.7 billion), and finally crime (\$1.4 billion). If we count only the economic costs typically viewed as relevant for policy, including fiscal externalities, the order of importance shifts considerably: healthcare costs (\$1.6 billion), crime (\$1.1 billion) and road accidents (\$0.7 billion) dominate, followed by labour costs (\$0.2 billion) and loss of life (\$0.2 billion). Where aggregate annual Australian alcohol excise and customs revenues exceed \$4 billion, the case for higher taxes or for more stringent regulation seems weak.

If the point of COI studies is to assess at which points alcohol interventions might best be targeted to reduce real social costs, they fail. But if their purpose is rather to influence public policy to increase the political salience of particular policy areas as a whole, they can be very effective. Single (2009, p. 120) notes one advantage of cost of illness studies is their generation of figures helpful "to argue that substance abuse issues merit a high place on the public policy agenda". As discussed in Section 5, below, they have been successful to that end.

4.2. BERL (2009)

In March 2009, Business and Economic Research Limited (*BERL*) published "Costs of Harmful Alcohol and Other Drug Use", a report jointly commissioned by the Ministry of Health and ACC. *BERL* was asked to measure the costs of drug and alcohol abuse to New Zealand society; the framework used by Collins and Lapsley (2008) was suggested as a model. Collins and Lapsley further served as independent external referees of the

produced report. *BERL* calculated annual social costs of alcohol and illicit drug consumption of \$6.8 billion, including \$4.8 billion in social costs from alcohol alone. As will be noted in Section 5, below, the *BERL* study received a fair amount of attention from the press and from policy makers as the study coincided with the New Zealand Law Commission's review of alcohol regulation.

The *BERL* report's method is very similar to Collins and Lapsley. Where Collins and Lapsley's discounting of private consumption benefits was implicit to its method, in which any potential failure of information or rationality was sufficient to deem all privately borne costs as social with no accounting for private benefits, *BERL*'s discounting was more explicit: "We assume that it is irrational to drink alcohol to a harmful level and that harmful alcohol use has zero private benefit." (p. 173) In defence of their work, they later argued that their remit was to consider only costs.⁵⁰ But deeming all private costs as socially relevant requires an assumption of no offsetting consumption benefits; the assumption of zero private benefit was built into their cost assessment.

BERL included a few key divergences that further inflated their measured social cost relative to an economic cost figure.⁵¹ We here take *BERL*'s cost items in turn, beginning with those least plausibly generating external social costs and concluding with those representing genuine external costs. Where *BERL* found some \$4.8 billion in social costs accruing to alcohol alone, plausible external costs constitute only some five percent of their headline figure.

4.2.1. Drug Production Costs

BERL followed Collins and Lapsley in deeming the potential for market failure as providing sufficient basis for deeming socially relevant all privately borne costs of harmful drinking. Where CL assumed, without particular justification, that thirty percent of alcohol consumed in Australia was without offsetting benefit as having been consumed by addicted drinkers, *BERL*, with similar lack of justification, reasoned that half of all alcohol consumed in New Zealand was consumed by harmful drinkers – those men consuming more than four standard drinks (two for women) on average per day were reckoned to receive no consumption benefit whatsoever from their drinking. A male consuming two Imperial pints of standard strength beer per day received no enjoyment from his consumption, by *BERL*'s assumption. Worse, *BERL* included taxes paid on that harmfully consumed alcohol as a social cost of harmful drinking.⁵² Spending on alcohol constituted \$700 million of *BERL*'s headline figure. The only portion of this that can plausibly be viewed as a social cost would be incremental excess spending on alcohol by

⁵⁰ "BERL rejects criticism of study" 6 July 2009, available at <http://www.berl.co.nz/1026a1.page>

⁵¹ A full examination of the *BERL* report is available as a working paper, Burgess and Crampton 2009. Figures presented here represent a revised assessment subsequent to more thorough examination of the CL working model on which the *BERL* figure was based. In particular, we have revised treatment of "consumption resources saved", leading to larger final social costs.

⁵² They corrected this after publication of our working paper and subsequent to comments by one of the authors of the current study, Crampton, at the 2009 New Zealand Economic Association Annual Meetings. The \$4.8 billion figure continues, however, to be cited.

those whose consumption exceeds their individual optimal level; were such an excess cost included, we would also need to weigh that excess cost against the benefits of drinking to drinkers. Consequently, we count no personal alcohol expenditure as constituting a social cost.

4.2.2. Intangible costs of loss of life

BERL counts as a social cost the value of life years lost due to excess alcohol consumption. The figures here suffer from two substantial problems.

First, when tallying the health costs of alcohol, and as noted in Section 4, above, CL netted from gross health costs some of the monetised health benefits of alcohol consumption. *BERL* took the alcohol aetiological fractions provided by CL but set equal to zero any item reporting a negative aetiological fraction, assuming away the potentially beneficial effects of drinking. While the *BERL* report was skeptical of any research suggesting any possible health benefits from moderate alcohol consumption, it deemed harmful consumption as by definition taking place beyond the range in which there were possible health benefits. However, cardioprotective effectives of alcohol extend well into the range in which all source mortality is adversely affected by alcohol use.⁵³ Consequently, *BERL*'s intangible cost is strongly overstated.

More importantly, barring those deaths accruing to external victims of drunk drivers, these loss-of-life costs fall on the drinker and consequently are properly viewed as internal. Costs falling on victims of drink drivers and alcohol-related homicides constituted less than five percent of *BERL*'s figure: only some \$67 million of their \$1.52 billion can potentially be deemed a social cost.

Finally, counting both intangible costs of loss of life and costs of forgone output due to loss of life constitutes double-counting where the value of life lost is based on a willingness-to-pay measure of the value of a statistical life, as noted in discussion of CL previously. *BERL* use the value of a statistical life year provided by the New Zealand Ministry of Transport. The Transport figure is based on willingness to pay for safety improvements that avoid a statistical death. It is also telling that the Ministry of Transport's estimates of the social costs of car accidents include only loss of output for those incurring temporary disability, not for fatalities.⁵⁴

4.2.3. Labour costs

BERL follows Collins and Lapsley in using a measure well in excess of a worker's annual wage as the measure of lost output from those experiencing premature mortality; they were slightly more explicit in their description of their method than were Collins and Lapsley. They write:

⁵³ Corrao et al, 2000, find in meta-analysis that alcohol's protective effects against coronary heart disorders continue at alcohol consumption levels double the lower bound of *BERL*'s threshold for harmful consumption. Heavy drinkers have greater risk of all-source mortality; however, counting only those disorders where alcohol's effects are pernicious rather biases results.

⁵⁴ See New Zealand Ministry of Transport (2009) and (2010).

The value to society of lost output is considerably larger than lost earnings alone, for example, in addition to lost wages there is also lost profit. As such, the earnings profiles were scaled up to reflect the difference between wages and residual value added. The resulting output profiles were based on the assumption that the average GDP per FTE (BERL Forecast Database) is 1.87 times the average wage income (StatsNZ).(pp. 35-6)

The decision to scale forgone wages added over \$650 million to *BERL*'s headline social costs of alcohol figure and constituted a fifteen percent increase in the headline figure. The WHO's Best Practice guidelines (Moller and Matic, 2010) deem a method more conservative than this as having been discredited since the late 1990s.

There are further problems with simply multiplying wages by the ratio of GDP per full time employee over average wages. The ratio of the two is an average that applies to the economy as a whole; for that average also to hold at the margin requires that workers have a constant value marginal product. This is implausible in any economy with diminishing returns to production factors; otherwise, average product would exceed marginal product. And, it is implausible to have other than a diminishing marginal product of labour in economies with factors of production beyond just labour.⁵⁵

Crampton and Burgess (2009) adjusted *BERL*'s figure by excising the multiplier they applied to labour costs and instead took the total value of forgone wages plus a ten percent margin for transitional frictions potentially imposed on employers as the total private and public costs. We further applied minor adjustment for labour market heterogeneity: workers dying from excess alcohol use are unlikely to have average labour market characteristics. We there also followed *BERL* in counting as a pecuniary but external benefit some \$300 million in consumption resources saved through premature alcohol-related mortality. On further examination of CL's method, generally followed by *BERL*, we have revised to exclude such adjustment.

CL and *BERL* attempt to estimate the change in GDP that would result absent alcohol-related premature death, injury, illness or absenteeism under the assumption that no worker can ever be replaced by either man or machine; they subtract from those estimates as a transfer benefit those resources that would otherwise have been consumed by a deceased worker. If we include as social cost only those labour-related costs externally imposed, discounting forgone private earnings, we cannot offset that measure by resources released by premature mortality.

Our revised figure includes only a ten percent frictional component that is plausibly imposed on employers where workers are paid their marginal product. Counting the full forgone earnings of external victims of drink drivers and of crime victims would be defensible but for that the value of those earnings is already incorporated in the value of lives lost; including both measures would constitute double-counting.

These adjustments reduced total costs to a little over half of *BERL*'s headline figure, from \$1.5 billion to \$806 million. The external component of those costs, \$174 million, included the ten percent frictional margin in addition to all forgone wages accruing to the

⁵⁵ We thank Seamus Hogan for this point.

external victims of drink drivers and of alcohol-related homicide. Plausibly external costs of forgone labour totaled approximately twelve percent of *BERL*'s headline labour cost.

4.2.4. Road Crash Costs

Costs of road accidents falling on parties external to the drink driver's vehicle are the most plausible social cost of alcohol. *BERL* assesses some \$200 million in costs accruing to property damage, travel delays, insurance administration, and emergency services, with loss of life, health care, and forgone earnings elsewhere counted. The bulk of these costs, \$132 million, are derived from insurance administration. However, the figure bears little relation to insurance administration cost statistics published by the Insurance Council of New Zealand. *BERL* attributed half of all insurance overhead costs to alcohol. But total insurance overhead costs were \$763 million; total car crash claims were \$739 million, and alcohol is involved in only a small minority of total car crashes. Correction for this and other errors in *BERL*'s method reduced the total figure from \$200 million to \$74 million, some \$38 million of which fell externally. External social costs of road crashes were less than twenty percent of *BERL*'s headline figure.

4.2.5. Lost quality of life

Victims of alcohol-related crime, including drink driving accidents, suffer real diminution in quality of life. Netting costs falling internally and adjusting for *BERL*'s overestimate of alcohol's contribution to overall crime costs, discussed in depth below, we reduced *BERL*'s figure from \$42 million to \$24 million.

4.2.6. Crime

The Single et al (2003) guidelines warn that estimates of crime costs of alcohol hinge on finding plausible causal relationships between alcohol use and crime. *BERL* estimates the contribution of alcohol to offending by use of surveys of prisoners, who are asked whether alcohol contributed to their incarceration. *BERL* assumes that those answering "some", "a lot", or "all" to that question would not have committed the crime absent alcohol use. It is certainly possible that harmful alcohol use can contribute to criminal offending. But is it plausible that everyone answering "some" to this survey question, where a prisoner may view alcohol dependence as exculpatory, would have failed to have offended absent alcohol use? We adjusted *BERL*'s estimates downwards by a third to approximately remove those answering "some", but would strongly prefer that crime estimates were based on more causal studies of the relationship between alcohol and crime.

BERL further assumes that expenditures on private security alarms, fencing, and deadlocks would decrease proportionately with crime reduction in the absence of harmful alcohol use.⁵⁶ However, most of these expenditures are fixed costs, not marginal. It is plausible that some individuals would choose not to pay to have their alarm system activated were crime to decrease, but decreased preventative measures would be met by increased opportunistic property crime. Expenditures on preventative measures would

⁵⁶ See footnote 111 of the *BERL* report.

not decrease proportionately with a decrease in crime; furthermore, *BERL* cites no evidence that the elasticity of preventative expenditures with respect to crime rates is unitary.

External crime costs were assessed at \$410 million.

4.2.7. Health care costs

BERL followed CL in applying alcohol attributable fractions to health care expenditures; however, and as noted earlier, they set equal to zero the attributable aetiological fraction for any disorders where alcohol use reduces disease burden. They write:⁵⁷

We use Collins and Lapsley's (2008) attributable fractions in our estimates of AOD-related hospital use and mortality rates. These fractions indicate some alcohol use may be beneficial but any other drug use is harmful. To concentrate on harmful drug use, zero fractions were applied to conditions for which alcohol provided a net benefit, that is, for conditions with negative attributable fractions. This approach is likely to underestimate the harmful impacts of drug use. Although the net beneficial impact was removed, the harmful component for those conditions could not be estimated. However, Collins and Lapsley advise that the harmful impact for beneficial conditions is minute.

Rather than worrying that their measure overstated the health costs of heavy alcohol use by discounting the documented health benefits of even heavy alcohol use for coronary heart disease, *BERL* worried that zeroing out CL's net positive attributable fractions still understated the health costs of harmful drinking. For example, if coronary heart disease is reduced for the majority of heavy drinkers but a smaller subset has increased heart disease, *BERL* lamented that CL's net aetiological fractions prevented their weighing only the costs incurred by that smaller subset.

In Crampton and Burgess (2009), we reduced health expenditures by removing that portion paid privately and by deflating crime-related alcohol health costs by the same fraction applied to crime costs; we noted that the costs remained a strong overestimate absent correction for *BERL*'s having assumed equal to zero any positive attributable fractions. External health costs were estimated at \$255 million, but with potential for downwards revision were *BERL*'s internal workings made available such that adjusted aetiological fractions could be applied.

4.2.8. Summary

In his review of alcohol laws in New Zealand, Law Commission President Sir Geoffrey Palmer weighed *BERL*'s estimated \$5.3 billion⁵⁸ in alcohol-related social costs against an alcohol excise tax take of some \$795 million⁵⁹ and on this basis argued for increased taxation and regulation. However, the external portion of those costs totaled only some \$967 million, and this figure is likely overstated absent correction for *BERL*'s

⁵⁷ At footnote 12.

⁵⁸ Palmer, 2009. He here used the figure that included joint costs of alcohol in interaction with other drugs; our revision began with the baseline of \$4.8 billion in costs attributable to alcohol alone.

⁵⁹ \$713 million in 2005/6, the fiscal year for which *BERL*'s cost estimates were derived.

overestimation of health care costs and inability to attribute a causal portion to crime costs.

BERL's tabulation put loss of life as the largest cost of harmful alcohol use in New Zealand (\$1.52 billion), followed by labour costs (\$1.48 billion), drug production costs (\$699 million), crime costs (\$562 million), health care (\$290 million), road crashes (\$200 million), and lost quality of life (\$42 million). The rank order of these cost items changes substantially when we consider the external, policy relevant costs: crime is most important (\$410 million) followed by health care (\$255 million), labour costs (\$174 million), loss of life (\$67 million), road crashes not included elsewhere (\$38 million) and lost quality of life (\$24 million). An economic cost accounting, which emphasises external costs, produces a sharply different order of priority to the healthist accounting which combines private and external costs. If the external costs of reduced productivity were the primary social cost of alcohol, as implied by *BERL*'s figures, excise options could be an appropriate policy solution, perhaps alongside policy changes enabling employers to make alcohol counseling a condition of continued employment for employees with alcohol dependence issues; if crime costs are the largest external cost of alcohol use, excise policy is a blunt tool for reducing those costs.

5. Policy Influence of COI Studies

In Australia, Collins and Lapsley's (2008) estimate of \$15 billion in social costs of alcohol has been cited thirty times on Australian television, in news, current affairs, and talk shows; has been cited seven times on radio; has been used in at least twenty-six opinion pieces and editorials, generally in support of stricter alcohol policy; and, has appeared in an additional seventy-nine news stories. Collin and Lapsley (2008) has been mentioned in the Australian Parliament on twelve occasions by nine MPs from the Australian Labor Party, generally in support of increased alcohol excise taxes – particularly on “alco-pops”, and an additional twenty-one times by five senators from the Greens, Family First, and Labor.⁶⁰ Subsequent to these references, substantial excise tax increases were levied in Australia. That popular concern over the apparent social cost of alcohol contributed substantially to pressure for stricter alcohol control cannot be proved, but would be consistent with Holcombe and Sobel's (2001) finding that the political process is sensitive to pecuniary externalities.

In order to see whether the influence of the Collins and Lapsley number is typical of social cost studies, we compared the level of media and parliamentary interest to two other studies around the same time, *BERL* (2009) and Rehm et al (2006). While cross-country differences in the number of media outlets, news digitization, and searchability make precise comparison difficult and unreliable, broad and tentative conclusions are possible. We focus only on studies for around the same period in order to avoid some of the bias which comes from increasing digitization over time. Were we to use earlier studies (such as the American study published in 2002 by Harwood et al), we would surely find a much lower proportion of news stories preserved.

BERL's estimate of the social cost of harmful alcohol use in New Zealand, which followed the Collins and Lapsley method but reached a much higher headline figure, featured prominently in the New Zealand media. Variations on the figure, normally 4.8 billion, 5 billion, or 5.3 billion, were cited uncritically in at least 32 newspaper news stories or features. The number was often cited as factual background by the reporter or quoted directly or indirectly by interviewees, most commonly Sir Geoffrey Palmer, head of the Law Commission and charged with reviewing New Zealand's policies regarding alcohol. Palmer would often contrast the number with excise revenue from alcohol and make an implicitly Pigouvian argument for increases in taxation.⁶¹ Palmer or those quoting him would also often misleadingly claim that the \$5.3 billion burden fell on taxpayers. An article in *The Dominion Post*, for example, states that “Sir Geoffrey

⁶⁰ Counts as of October 2010. Full citations available on request.

⁶¹ “It is an axiomatic principle of welfare economics that the costs engendered by an activity should be internalized to that activity. That way the allocation of resources is greatly improved because the consumers do not buy the product at a subsidized cost but at a cost that reflects the externalities the use of the product causes. This is the very reason we have the current excise tax on alcohol to prevent harm. But the gap between the current tax take of \$795 million for excise tax and the estimated alcohol costs in the *BERL* study - \$5.296 billion, is substantial.” Rt. Hon. Sir Geoffrey Palmer, Address to New Zealand Police, 2009. Palmer clearly understood *BERL*'s figure as providing a measure of externally imposed cost

deplored the gap between the \$795 million raised by excise tax and the \$5.3 billion social cost of drinking, and said drinkers, not the taxpayer, should pay the bills.”⁶²

At least six editorials or opinion pieces cited the number as factual background, and three criticized the number. One of these three was written by Crampton and the other two cited the work of Crampton and Burgess. The figure was also mentioned on television and radio, including both major 6pm television news shows.

Only two mainstream newspaper articles questioned the number (both citing Crampton and Burgess). The National Business Review also had a number of stories describing the debate between *BERL* and Crampton and Burgess.

In the media, the number was cited in support of many policy interventions, most commonly associated with the recommendations of the Law Commission report, which included raising excise taxes, lowering the purchase age, mandating bar closing hours, and lowering the alcohol limit for driving. The number was also cited as an argument for advertising restrictions and a number of other interventions. The number was also mentioned twice in parliamentary debates, both by Labour MPs on the second reading of the *Sale of Liquor (Youth Alcohol Harm Reduction) Amendment Bill*, on 17 June, 2009.

The 2006 Canadian study by Rehm et al took a different methodological approach and reached a lower headline social cost number than either Collins and Lapsley or *BERL*. They claimed to be studying only external costs, and therefore excluded the purchase cost of abused alcohol. They also excluded intangible costs. The result was a lower headline social cost figure: 1.26% of GDP, compared to 1.59% for Collins and Lapsley and 4.47% for *BERL*.

Interestingly, it also seems to have generated less interest from the media and politicians, and has been misinterpreted less often. We were able to find only eleven news stories and three opinion pieces, all of which cited the \$14.6 billion figure, sometimes rounded to \$15 billion or \$463 per capita, uncritically. Some stories were reporting on the Rehm et al study, while others used the social cost number as factual background to other stories about alcohol issues. We were also unable to find any parliamentary mentions of the number, though it was used in as background in one bill.⁶³ While this difference might be at least in part due to differences in searchability, and our location in the antipodes gives us greater access to local sources, comparing the level of attention each numbers received from its country’s most-circulated daily newspaper tells a similar story: The Rehm et al results were reported or cited only three times in the *Toronto Star*. The Collins and Lapsley number was mentioned in the *Herald Sun* ten times, and the *BERL* number was mentioned in the *New Zealand Herald* six times.

The number also seems to be used misleadingly less often than in Australia or New Zealand. We were unable to find any cases of reporters or interviewees comparing the social cost number to excise tax revenue, and only one case where the number was

⁶² Wood, Stacey. 25/04/2009 “More costly alcohol in plan to deter abuse” *The Dominion Post*, pA9.

⁶³ *Bill C-15: An Act to amend the Controlled Drugs and Substances Act and to make related and consequential amendments to other Acts*, p. 4.

obviously interpreted incorrectly, as the cost to employers.⁶⁴ While more careful and systematic study would be required to robustly test whether the Collins and Lapsley method's more complex interpretation allows for greater intentional or unintentional misrepresentation in the media, our comparison of the Australian, New Zealand, and Canadian studies does seem to point in that direction.

⁶⁴ White, Patrick. Mar. 26, 2008. "Hospitality sector tops list of industries with booze problems" *The Globe and Mail*.

6. Discussion

The headline figures in Collins and Lapsley (2008) and *BERL* (2009) can be understood as approximately measuring the dollar value of labour and capital reallocated in the economy because consumers choose to consume alcohol in quantities different to that which is health maximising. It is one thing to acknowledge both the external and privately-borne costs associated with alcohol use. These costs are substantial, in the order of \$975 million and \$2.3 billion, respectively, annually in NZ, against which is set some \$713 million in excise tax and uncounted consumption benefits. It is quite another to infer from the existence of these costs irrationality on the part of anyone who consumes more than is healthy and to presume zero benefit for any of their consumption when they do. The method deployed in the healthist literature produces large numbers that have no relationship with economic value added or destroyed, consumer surplus, social cost or GDP.

The healthist literature passes off headline costs as representing value in a two step process. First, it assumes without evidence that consumption in excess of an epidemiological standard, or consumption that results in experienced probabilistic downside costs, is due to irrational decision-making. Second, the healthist literature cites assumed imperfections in rationality and information as reason to dismiss by assumption the existence of all economic benefits including enjoyment from such consumption.

On these assumptions depend the majority of headline costs in healthist reports. The presumption of irrationality ignores the rather obvious possibility that consumers generally do not pursue health maximisation to exclusion of all other possible objectives and instead will sometimes rationally choose to consume more or less alcohol than is recommended by health experts in pursuit of objectives other than health maximisation. Even if irrationality, and not preferences, explains deviation from health maximisation, the healthist literature misuses this explanation for behaviour by citing it in support of discarding all consumption benefits, causing all associated private costs to be counted as a social cost.

Quite apart from the extraordinary nature of this approach, unknown (to our knowledge) in the economics literature outside of Cost of Illness studies, is the fact that it entirely abandons revealed preference and in place of consumers' preferences substitutes desideratum given by the healthist method. This is pure paternalism: information revealed by consumption choices is discarded by assumption. Why this consumption occurs is not explained by the healthist literature other than by appeal to irrationality and error; the implied view is that this is a massive, repeated, chronic mistake by up to a sixth of the adult populations of Australia and New Zealand, accounting for up to half of all alcohol consumed. By abandoning revealed preference, Cost of Illness studies also discard any claim to measuring economic costs which can only rightly be understood in the context of revealed preference.

These objections are given no serious consideration in the healthist literature. We emphasise that such objections depend neither on perfect rationality nor on perfect information. It is common ground that consumers err and that occasionally terrible outcomes occur. However, it does not follow from either of these observations that

consumer decision-making is irrational, or that there are no consumer benefits from any potentially harmful drinking: yet on these assumptions both *BERL* and CL depend.

Though the COI method developed by CL and others produces figures without direct economic interpretation or positive policy implication, innovations by Collins and Lapsley in packaging their figures as representing net social cost have granted those figures de facto policy relevance. In New Zealand, the Rt. Hon Sir Geoffrey Palmer, in the midst of his review of New Zealand's alcohol regulatory regime, apparently mistook *BERL*'s figure as representing a cost borne largely by persons other than the drinker himself.⁶⁵ In Australia, the \$15 billion CL figure, less than \$4 billion of which could possibly be considered as policy relevant, was described in the Australian Parliament by M.P. Bernard Ripoll as "a massive cost to every single Australian and every single taxpayer"⁶⁶; by M.P. James Tournour as a social cost to which must be added the economic costs of injuries and absenteeism⁶⁷; by New South Wales Police Commissioner Andrew Scipione as constituting only the costs of alcohol-related crime⁶⁸, by *The Age* as a cost to which needed to be added the cost of lives lost⁶⁹; and by the *Courier Mail* as a potential saving to the country if Australia were to "cut back on the booze."⁷⁰ In these cases, the \$15 billion figure was generally viewed as a lower bound to which ought be added a host of other costs rather than a figure mostly counting the costs that drinkers impose on themselves.

As Holcombe and Sobel (2001) point out, voters are not insensitive to fiscal externalities. By presenting costs drinkers impose upon themselves as social costs to the country, COI measures following from CL may help build popular support for paternalistic policies. Embedding paternalism in the assumptions of the model rather than advocating paternalistic policies directly appeals to voters' pocketbooks; where a weak liberalism might otherwise oppose paternalistic policies, voters might sensibly object to footing the perceived bill for the downside costs of others' drinking.

The true cost of cost studies then is not the amounts paid by Ministries of Health for consultancy reports. Social cost studies presenting private costs as socially relevant build public support for paternalistic policy while hiding the policy's embedded paternalism. Voters take the cost measures as impartial measures of the cost they're called upon to bear due to others' actions and shift outward their demand for corrective measures. Equilibrium policy adjusts towards greater paternalism. Consequent losses in consumer surplus are the true cost of cost studies.

⁶⁵ See Palmer, 2009, previously cited.

⁶⁶ Hansard, 25 February 2009.

⁶⁷ Hansard, 24 February 2009.

⁶⁸ Cited by Steve Larkin, *Sydney Morning Herald*, 27 May 2008.

⁶⁹ Medew and Munro, *The Age*, 26 August 2009.

⁷⁰ 18 September 2008

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