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The Price of Everything, The Value of Nothing:
A (Truly) External Review Of BERL's Study Of Harmful Alcohol and Drug Use

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Abstract: 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, but not to evaluate specific interventions. 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. The report was cited by Law Commission President Sir Geoffrey Palmer as evidence in support of greater regulation, gaining considerable media coverage.

We find substantial flaws in BERL's method that together account for well over 90% of BERL's calculated costs of alcohol use. Corrected external costs of alcohol use amount to $662 million and are roughly matched by the $516 million collected in alcohol excise taxes. The BERL report is wholly inadequate for use in assisting policy development.

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

JEL Classifications: H23, I18, J17, A11

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'In view of the existing quantomania, one may be forgiven for asserting that there is more to be said for rough estimates of the precise concept than precise estimates of economically irrelevant concepts.' – Mishan, 1971, p. 705

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1. Executive Summary

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, but not to evaluate specific interventions. BERL calculated annual social costs of alcohol and illicit drug consumption of $6.8 billion, including $4.8 billion in social costs from alcohol. The report was cited by Law Commission President Sir Geoffrey Palmer as evidence in support of greater regulation, gaining considerable media coverage.

This paper reviews BERL's report, finding it contains serious deficiencies. For reasons of time, we focus exclusively on BERL's tabulation of the costs of alcohol. Methodological errors account for approximately forty percent of BERL's listed costs: double-counting of the costs of insurance and the costs of insured losses; counting as costs all of the alcohol consumed by harmful drinkers rather than just the portion harmfully consumed by those drinkers; incorrect use of multipliers; not accounting for cohort differences between serious alcoholics and the rest of the population in labour force characteristics; and, assuming an implausibly large reduction in crime in the absence of alcohol. Three additional cornerstone assumptions further inflate costs. First, for alcohol consumers BERL uses an epidemiological basis to define the threshold for economic harm. This definition is crossed after 1.8 pints of beer and is low enough to catch one New Zealand adult in six. All illicit drug consumption is assumed harmful. Second, BERL assumes all harmful alcohol and drug consumption is irrational. Irrational consumers are incapable of detecting private costs in excess of private benefits. To the extent those private costs exceed benefits, they are counted as social costs. Third, BERL assumes irrational consumers enjoy *zero* gross (not net) benefits, meaning all private costs are counted as social costs. The second and third assumptions are not justified – they are simply asserted by BERL.

The effect of these assumptions on BERL's cost estimate is profound. An analysis that would otherwise be confined to externalities is instead inflated by private costs. BERL counts as social costs the production costs of alcohol and drugs, output forgone by time away from work, reduced productivity at work, and even the value of forgone unpaid household production, among many other private costs. A correction of BERL's method – necessarily approximate because of BERL's poor citation, limited description of methods and refusal to provide any working – finds total costs are about half and external costs are less than ten percent of BERL's headline figure. The BERL authors argue that costs of harmful alcohol use total $4,794 million. Correction for methodological errors reduces costs by forty percent, to $2,955.1 million, of which policy-relevant net external costs amount to only $146.3 million, less than five percent of BERL's headline $4.8 billion figure for alcohol. Of these, crime costs account for 63%, health care costs for 18%, and road crash costs for 11%.

Many other weaknesses in BERL's analysis are documented. The economic literature on alcohol and drug use contains a number of results which confound BERL's assumptions: addiction has been found to have rational foundations; alcohol and drug abuse tends to be a symptom of other problems; moderate drinkers, many consuming quantities above the

lower bound of BERL's harmful range, earn more and live longer; alcohol saves many more lives than it takes and has health benefits well beyond the point where BERL says harm starts and all benefits stop. Any policy based on analysis that ignores these benefits, as BERL's study of harm necessarily does, carries the obvious risk of doing more harm than good. BERL's report also frequently misleads: for example its executive summary twice confuses a study of costs with an analysis of welfare. As is correctly noted by BERL at page 70, policy analysis requires an assessment of costs and benefits, yet the analysis does not reflect this fundamental requirement.

The credibility and independence of BERL's work is also questionable, further limiting its usefulness. The analysis ignores most of the large body of peer-reviewed economic literature in favour of a few (mostly commissioned) reports by a very small subset of health economists whose reports have been subject in that literature to many of the same criticisms leveled here. BERL's report can be reasonably characterized as a New Zealand implementation of a methodology developed by Professors Collins and Lapsley, cited over 100 times in the BERL report. These same authors provided the external peer review of the report.

It is customary in reviews like this to offer at least some praise, but BERL's report has few redeeming features. Beneath its professional veneer, BERL's report fails in multiple dimensions. Its conclusion is assumed. Its core assumptions defy both reason and the body of peer-reviewed literature. Its headline figures are overstated by an order of magnitude. The methodology is without foundation in the economics discipline, and the report has been peer-reviewed by the authors of its flawed methodology. Its literature review is highly selective. The report contains elementary errors and misunderstandings of economics, and policymakers are likely to be misled by the report's loose terminology and spurious comparisons[1]. In sum, these flaws render the report of negligible use for subsequent policy-making.

Our review proceeds as follows. Section 2 describes the BERL study. Section 3 discusses specific problems with BERL's methodology. Section 4 assesses each cost item in turn and provides revised estimates for each cost item. Section 5 notes other problems with the BERL report. Section 6 concludes. This review is not commissioned work; it was neither requested or funded by any person or organization. Our interest is to see policy informed by robust analysis. We take no position on the complex question of whether more (or less) regulation of alcohol and illicit drugs can be justified on economic grounds; however, we suggest that policy aimed at reducing the external costs of alcohol use might be best addressed by examining first the areas where external costs weigh most heavily: notably, crime.

2. The BERL Study

In March 2009, Business and Economic Research Limited ("BERL") published "Costs of harmful alcohol and other drug use" (BERL 2009). The study reported that the social

[1]Many of our criticisms also apply to BERL's (2008) report to the New Zealand Police on costs of harmful drug use

costs of harmful alcohol and drug use in New Zealand amounted to $6,881 million, including an estimated $4,794 million of diverted resources and lost welfare from alcohol and $1,427 million from drug use, with the remainder from joint harmful use of alcohol with other drugs. The main components of the $4,794 million in purported costs of harmful alcohol use were intangible costs of premature mortality ($1,519.6 million), costs of output lost due to premature mortality, injury, or lost productivity ($1,478.4 million), the costs of producing harmfully used alcohol ($698.7 million), and costs of alcohol-fuelled crime ($562.2 million). The estimates are derived using a counterfactual that assumes zero harmful drinking and no illicit drug use.

The study was commissioned by the Ministry of Health and the Accident Compensation Corporation (ACC) in the first half of 2008. The report's purpose was explained in the Ministry's Request For Tender (RFT): [2]

> *Accurately quantified costs will assist in evaluating arguments for and against government intervention pertaining to alcohol and other drug related harm.*

The RFT (p. 12) ruled out BERL assessing individual policies:

> …*is* <u>*not*</u> *however, an evaluation of which interventions should be supported* (their emphasis).

The BERL cost estimation methodology has the following essential features. Only harmful drinking and drug consumption is considered. Harmful drinking is defined using an epidemiological threshold, which BERL sets at an average daily consumption of 40 grams of alcohol for men and 20 grams for women.[3] To put this in every day terms, 40 grams of alcohol is contained in 1.8 English pints of beer with 5% alcohol by volume.[4] That is, BERL defines harmful consumption to commence before a male has consumed two pints of beer on average per day, and before a female has consumed one. We might then question why such an opaque measure of alcohol consumption rather than a transparent one was chosen: transformed into normal units of consumption, BERL's standard seems rather austere.

BERL estimates that their threshold catches 50% of all alcohol consumed in New Zealand and about 439,000 New Zealanders aged 20 and over. All illicit drug consumption is considered harmful.[5] Both costs and benefits of non-harmful alcohol consumption are largely excluded from the analysis.[6]

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[2] Ministry of Health (2008), p. 11.

[3] BERL (2009) fn 9 p. 7.

[4] The conversion from grams alcohol to pints is as follows. 568.26 ml of beer (1 English pint) with 5% alcohol by volume has 28.41 ml alcohol, or 22.31 grams alcohol given alcohol's specific weight of 0.78506 grams/ml. 40 grams of alcohol is contained in 40/22.31 = 1.8 pints of 5% beer.

[5] Smoking is not considered in BERL (2009).

[6] All drink-driving accidents and deaths are counted by BERL as harmful drinking regardless of average daily consumption by the driver, and costs of all crimes where the criminal reports alcohol as having contributed at least somewhat to the offence are attributed to harmful use.

Under BERL's methodology, the consequence of crossing the harmful consumption threshold is profound. Harmful drinkers and all consumers of illicit drugs are assumed to be irrational, and incapable of detecting the costs of private drinking and/or drug consumption exceeding the private benefits. At this point, BERL takes the most radical approach possible by assuming that irrational consumers of alcohol and drugs receive zero *gross* (not net) benefits from any of their consumption. That is, harmful consumers receive zero enjoyment, economic or health benefits from any of their consumption, including for the first 40 grams of alcohol (1.8 pints of 5% beer) consumed. All illicit drug consumption is assumed irrational and therefore free of any gross economic benefit.

Without any private benefit to offset private costs, BERL considers all costs associated with irrational consumption, and many of the negative private and public consequences that flow from that consumption, as a social cost. BERL casts a wide net: social costs include all alcohol and drug production costs, excise taxes, customs costs, and even forgone production due to alcohol-related imprisonment as social costs. Without any offsetting benefits, the private and public costs counted by BERL for an activity as widespread as alcohol consumption are large. Consequently, BERL reports combined social costs of harmful alcohol and illicit drug consumption exceed the value of goods consumed by a factor of 10.[7]

The price of the BERL report, paid by the Ministry of Health and the ACC, was $135,500.[8]

3. BERL's Methodology

3.1. Three Fundamental Problems with the BERL Method

Besides other errors detailed in Section 4, below, BERL's methodology for deriving the social costs of harmful drug use contains three highly questionable cornerstones:

1. It uses a threshold for *health* costs to define a cutoff for *economic* costs
2. It assumes anybody who drinks enough to cross an epidemiological threshold is irrational
3. It assumes anyone who is irrational enjoys zero gross (not net) economic benefits from drinking

BERL defines a threshold for harmful drinking based on epidemiological evidence. In itself, this presents no problem.[9] However, BERL uses that health threshold to define cutoff points for economic costs. Beyond this epidemiological threshold, BERL maintains net economic benefits turn negative.

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[7] Value of goods excludes GST and excise taxes.

[8] Plus GST, we presume. Letter from Janice Wilson, Ministry of Health to R L Kerr, 21 May 2009.

[9] Note, however, that the selected cut-off point is contestable: a meta-analysis of studies of coronary heart disorders (Corrao et al. 2000) finds that alcohol has protective effects at consumption levels more than double the lower bound of BERL's threshold for harmful consumption.

Embodied in BERL's approach is an assumption that the consumer's utility function is limited to consideration only of health. According to BERL, non-health benefits from alcohol or drug consumption, like enjoyment or any economic benefits associated with drinking from social networking (see section 5.2.1) is not considered by a rational consumer. BERL really seems to believe this to be a realistic assumption: in three places in their report BERL considers the economic benefits of alcohol consumption, but consideration is limited to health benefits leaving the impression that is all they consider relevant.[10]

Empirical studies show the demand for alcohol has many factors, undermining BERL's claim. For example, Mast, Benson and Rasmussen (1999) estimate a model of beer consumption that includes income, unemployment, local tourism, distance to nearest major brewery and religion types as explanatory variables, among other things.[11] Most variables were found to be significant. BERL's claim is that economic benefits of drinking turn negative at the point of epidemiological harm. But because demand is affected by factors other than (perceived) health effects, the relationship postulated by BERL cannot be generally true. A rational, fully informed individual with a utility function influenced by *anything* other than their health may weigh costs and benefits and decide another drink is worth the cost or, if a religiously motivated teetotaler, that the first drink or two are not worth the benefits.[12]

The effect of BERL's use of a health threshold to determine the cutoff point for economic benefits is to set a low threshold that catches a large number of adults, around one New Zealand adult in six, substantially magnifying BERL's headline economic costs.

BERL then makes the key assumption of its methodology: every consumer of illicit drugs and anybody who drinks enough alcohol on average to cross an epidemiological threshold is *irrational*, that is, they are incapable of weighing the private costs and benefits of their alcohol or drug consumption.[13]

The irrationality assumption has two effects which when combined are responsible for the great majority of BERL's multi-billion dollar headline annual costs. First, irrationality allows BERL to count private costs as social costs, at least to the extent that private benefits fall short of private costs. BERL's reasoning is as follows. While externalities are usually considered relevant to the analysis of public policy, private costs and benefits are not because it is assumed costs voluntarily borne are justified by some (perhaps unseen) private benefit. BERL uses irrationality to break this rule: if private costs are not being offset by private benefits then they may be counted as a social cost and are of interest to

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[10] BERL considers the benefits of alcohol and illicit drugs on pages 8-9, 29-30 and 93 of their report. In each case, the only potential benefits considered (and rejected) are health effects.

[11] Concern for health effects is not among the variables estimated.

[12] It would be rather interesting to tabulate the social costs (using a BERL-inspired methodology) of *insufficient* drinking by those for whom moving from zero consumption to one or two drinks per day would confer health benefits. We would not, however, presume to suggest that policy ought be used to dissuade their forbearance.

[13] In section 3.3 we show that empirical evidence supports rational decisionmaking even for addicted consumers.

policy makers. Private costs greatly exceed externalities even for alcohol and drug consumption, so irrationality has a substantial effect on headline costs.

The second effect of BERL's irrationality assumption is to give BERL the freedom to decide by how much the private benefits of harmful alcohol and drug consumption fall short of costs. Irrationality only says gross economic benefits are less than gross costs but not by how much. The difference between the two contributes to social cost. At one extreme, BERL could decide benefits are worth marginally less than costs, minimizing the contribution of private costs to social costs.

However, what BERL did was assume the gross private benefits of harmful alcohol and drug consumption are *zero*. That is, harmful drinkers and drug users receive no enjoyment, health, economic or social benefits from their consumption at all. By assuming zero gross benefits, BERL is able to include all private costs in their estimate of social cost. This assumption accounts for approximately two thirds of the headline BERL estimate of social costs.

Astonishingly, BERL offers no justification for these cornerstone assumptions. In section 4 of this review, we show that the combined effect of these cornerstone assumptions, and other less serious assumptions, is to overstate social costs by a factor of more than 20. BERL has, in other words, assumed its answer.

These represent our most serious concerns with the BERL methodology. The remainder of this review considers other aspects of the BERL report starting with BERL's apparent confusion over it scope.

3.2. Is This A Cost/Benefit Study?

Policy analysis generally requires an assessment of both economic benefits and costs. BERL explains early in the report that theirs is not a cost/benefit analysis:[14]

> *This study takes a conventional approach for economic cost studies, which "do not attempt to fully consider the economic benefits of alcohol… and other drugs, and should not be confused with cost-benefit or cost-effectiveness analyses" (Single et al, 2003: 14).*

BERL offers a number of justifications for not fully considering benefits: this approach is conventional (p. 10); social costs are the most relevant "as they determine the costs that an activity …imposes on the rest of a community" (p. 16); benefits are out of scope (p. 6, fn 52 p.45); there is an absence of "rigorous evidence" for certain types of benefits (p. 29). Yet BERL does consider economic benefits throughout its report and generally, but not always, decides they are zero. For example:

> *…health benefits due to drug use are explicitly excluded from the scope of the study. This is due to the absence of rigorous evidence for health benefits from the consumption of illegal drugs, and contentious studies regarding the health benefits of alcohol (p. 29)*
>
> *Any illegal drug use is assumed to be harmful, reflecting the absence of evidence for the non-medical health benefits from the consumption of illegal drugs (p. 93).*

[14] P. 10.

We assume that it is irrational to drink alcohol to a harmful level and that harmful alcohol use has zero private benefit. (p. 173)

Expenditure on alcohol used in a harmful fashion, including these later taxes, is arguably not matched by an equivalent private benefit (fn 107, p. 105)

all illegal drug use is assumed to be harmful and consequently has no private benefit (p. 173)

BERL does count benefits in places, for example in the form of reduced consumption[15] (p. 36), avoided use of healthcare (p.10) and avoided unemployment social welfare payments (p. 54) due to alcohol and drug-caused mortality. BERL treads a fine line in counting some benefits but ignoring others. Their challenge in taking a cost-only approach is to decide at what point benefits become so obviously inseparable from costs that benefits are most reasonably (less-embarrassingly?) left in the analysis. The trade-offs in that decision highlight the anomalies that can arise in a cost-only methodology. As discussed in Section 4, below, many of these figures have required extensive revision. For example, while reduced consumption by those enjoying premature mortality may count as an external benefit to others, it should also count as an internal cost to the prematurely deceased.

Part of the confusion over whether BERL's report is a cost benefit analysis also stems from references in the report to welfare effects and "total impacts". There are two references to welfare effects in the executive summary of the report giving the impression that both costs and benefits have been properly considered by BERL (see section 5.1.1), and may explain the Law Commission's confusion in using the BERL report's "dramatic findings" to argue for policy changes – something to which the BERL methodology is manifestly ill-suited.[16]

Is BERL's study a cost/benefit analysis? Confusion over this question is to some extent unavoidable when one decides to count one side of the ledger extensively but the other only haphazardly. At times, the dividing line is unclear. But BERL takes a position on the benefits of harmful drinking: it is assumed they are zero because, it is said, harmful drinkers are irrational. Were BERL's brief extended to include benefits of harmful drinking, drinkers would, in BERL's world, still be irrational and therefore presumably enjoy zero gross economic benefit from drinking. Benefits elsewhere would come into the analysis and would have a significant effect. The BERL report is a study of costs not because BERL assumes benefits are out of scope but because BERL assumes in most cases benefits equal zero.

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[15] BERL counts lost production due to alcohol-related injury and mortality as a cost. It offsets this by deducting the value of forgone consumption, in effect counting lost consumption as a benefit of harmful alcohol use.

[16] See "The Law Commission's Liquor Review: Address to New Zealand Police's "Alcohol Related Harm" Breakfast," 24 April 2009, p. 4. Available from www.lawcom.govt.nz. At p. 70, BERL says: "According to Collins et al (2006) avoidable cost estimates on their own do not indicate the rate of return a community gets from investing in alcohol misuse prevention and intervention over a period of time. A cost benefit analysis is required to produce this information."

3.3. Rational vs Irrational Consumption

Irrationality is a central idea in the BERL methodology, fulfilling two roles. First, irrationality is used to explain why drinkers exceed the threshold for harmful drinking. Second, irrationality is used to justify ignoring all gross economic benefits of harmful drinking. We considered the second point in the previous section, and address the first point here.

BERL's entire consideration of rationality is in the appendix of its report at page 173, and can be summarised as follows:

- Non-harmful consumption is rational. For rational consumption private costs can be ignored because they can safely presumed to be offset by private benefits. The rational consumer consumes when benefits exceed costs;
- Harmful alcohol and drug consumption is irrational.[17] The source of irrationality is intoxication or dependence; and
- Irrational consumption means the private cost of consumption exceeds the private benefit, and the difference between these values is counted as a social cost.

BERL is too quick to resort to irrationality to explain consumption in excess of a minimum health limit for at least two reasons. First, as noted in section 3.1, evidence strongly suggests non-health factors influence the demand for alcohol, meaning an epidemiological threshold is a poor proxy for economic harm and irrationality. Second, even addiction, a subset of harmful alcohol and drug consumption, can be explained in a rational economic framework. The seminal work is by 1992 Nobel laureate Gary Becker and Kevin Murphy (1988), who define addiction as:

> *[A] good is addictive if and only if consumption of the good at different moments in time are complements. Moreover, the degree of addiction is stronger when the complementarity in consumption is greater. The link between addiction and complementarity implies that an anticipated increase in future prices of addictive goods lowers current consumption. These negative effects of anticipated future price changes on the present consumption of addictive goods are a major way to distinguish rational addiction or rational habit formation from myopic behavior (p. 689)*

BERL does not consider the Becker and Murphy model, but frequently cites a paper by Collins and Lapsley (2008a:10) that does. Collins and Lapsley reject the Becker and Murphy model on the grounds that:

> *The theory of rational addiction... does not merely demand rationality; it demands both rationality and full knowledge. Furthermore, it demands rational behaviour in a situation of full knowledge at the time at which the addiction was acquired. 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.*

[17] BERL uses softer wording: "In the case of harmful drug [i.e. alcohol and illicit drug] use, however, individual decisions are not necessarily made on a rational basis…" (p. 173). The upshot of this discussion is that all harmful alcohol and drug users are assumed irrational and none enjoy any gross economic benefit from consumption.

The proof of the pudding is in the eating. Becker, Grossman and Murphy (1994) empirically test the rational addiction theory of Becker and Murphy (1988) by searching for complementarity in current and future consumption of cigarettes when prices change. They test rational addiction against a myopic "irrational" model of consumer behaviour. The evidence favours the rational model of consumer behaviour:

> *This paper tests the model of rational addiction by considering the response of cigarette consumption to a change in cigarette prices. We examine whether lower past and future prices for cigarettes raise current cigarette consumption. The empirical results tend to support the implication of addictive behavior that cross price effects are negative and that long run responses exceed short-run responses. We find that a 10 percent permanent increase in the price of cigarettes reduces current consumption by 4% in the short run and 7.5% in the long run. In contrast, a 10% increase in the price for only one period decreases consumption by only 3 percent. In addition, a one-period price increase of 10 percent decreases consumption in the previous period by approximately 0.6 percent and decreases consumption in the subsequent period by 1.5 percent.*

Chaloupka (1991) uses microdata on cigarette consumption to test for Becker/Murphy rational addiction, rejecting the myopic model of addictive behavior in favour of rational addiction model. Baltagi and Griffin (2002) test for rational addiction in US liquor consumption, finding evidence in favour of rational addiction. These articles reference other studies also finding empirical support for the Becker-Murphy model.

Additionally, Becker and Murphy (1988:687) cite evidence that smokers, including youths, are well-informed and respond rationally to the dangers of smoking:

> *Ippolito, Murphy, and Sant (1979) estimate that 11 years after the first Surgeon General's report on smoking in 1964, per capita consumption of cigarettes and of tar and nicotine had been reduced by 34 percent and 45 percent, respectively. This evidence blatantly contradicts the view that the majority of smokers were myopic and would not respond to information about future consequences because they discounted the future heavily.…The behavior of teenagers is persuasive evidence of forward-looking behavior by smokers. Teenagers are often said to be among the most impatient (see the questionnaire evidence in Davids and Falkoff 1973). If so, their propensity to smoke should be hardly affected by health consequences delayed for 20 or more years, although parental disapproval may have a big effect. Yet smoking rates of males between ages 21 and 24 declined by over one-third from 1964 to 1975.*

On our reading, this passage and the other empirical evidence presented here categorically refute Collins and Lapsley's claims that consumers, and especially teenagers, are unlikely to have the information they require to respond, and contradict BERL's cornerstone assumption of irrationality. Evidence indicates the addicted respond rationally to incentives: that is, they are aware of and capable of weighing costs and benefits and responding in a way that is consistent with non-addicted people.

Our claim is not that the rational addiction explanation is definitive; non-rational models of addiction also find support in the literature. Our point is that BERL is too quick to dismiss rational explanations for heavy and addictive use of alcohol and drugs. The question of whether harmful and addicted drinking and drug use has rational foundations is at the heart of the BERL methodology, yet BERL gives no indication they are even aware of this literature. If rationality is instead assumed, then private costs are at the margin matched by private benefits (with benefits exceeding or well-exceeding costs for

inframarginal consumers) and social costs are confined to externalities. In that case, we would estimate consumer surplus from alcohol consumption using data on price elasticity of demand for different cohorts of drinkers and net these benefits from the total costs figure we report. However, these benefits would remain internal to the drinkers and only net external costs should be of policy relevance.

We take the middle ground by making the less restrictive assumption that private costs do not exceed private benefits by more than epsilon[18] for each harmful drinker: we do not attempt to estimate consumer surplus enjoyed by harmful drinkers whose consumption nevertheless leaves them better off in utility terms. When only net external costs - policy-relevant costs - are considered, headline costs collapse to just $146 million or 3% of the headline figures reported by BERL.

3.4. Avoidable Cost Assumption

In the executive summary, BERL reports:

> *Using estimates from international research, this study suggests that up to 50 percent ($3,440 million) of the social costs of harmful drug use may be avoidable.*

This avoidable cost estimate has no substance for the following reasons.

First, the 50% appears to be based solely on estimates by Collins and Lapsley (2008b:33) who look only at avoidable alcohol consumption and mortality, not illicit drugs or unemployment or injuries, and so on. Nearly all of the policies they consider are specific to alcohol, and illicit drugs are presently consumed in spite of an outright ban backed by severe penalties. Yet BERL applies these avoidable consumption and mortality estimates across the board.[19]

Second, Collins and Lapsley estimate reductions of 40% to 49% yet BERL assumes 50% (why not 45%?).

Third, our reading of the estimates by Collins and Lapsley (2008b) is that they grossly overstate the potential for reductions in harmful drinking, for four reasons.[20] First, the set of policies considered by Collins and Lapsley to be capable of achieving these reductions compared with the status quo are generally policies already in place and face declining marginal returns.[21] Second, even the most drastic government efforts to reduce alcohol

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[18] Epsilon refers to some arbitrarily small amount. This suggestion is based on the view that BERL's irrationality implies only that gross benefits are less than gross costs by at least some small amount (epsilon); nothing in the methodology used by BERL implies gross benefits of irrational drinking must equal zero.

[19] BERL seems to acknowledge this point at p. 69.

[20] In their review of Collins and Lapsley (2008b), Access Economics (2008b:ii) agrees: "The methods and numbers selected to derive the conclusion that it would be possible to reduce the social costs of alcohol over time by about a half, have no valid evidence basis, in our view."

[21] The full set of policies considered by Collins and Lapsley are: alcohol taxation, bans on alcohol advertising, anti drink-driving measures, “brief interventions” (mostly advice and information provided to at-risk drinkers during consultation by a physician), greater regulation of access to alcohol, alcohol ignition locks, guidelines for low-risk drinking, standard drinks labeling, and “other interventions” such as school and workplace programs. Most or all of these interventions are in place already, and we doubt that even

consumption, for example US Prohibition, have been unable to sustain reductions in total consumption of alcohol by more than (roughly) 30-40%.[22] Third, evidence indicates alcoholism is often symptomatic of other underlying problems,[23] which limits the effectiveness of policies targeting alcohol alone. Fourth, population wide controls such as excise taxes are ineffective at reducing heavy drinking because response rates are highest among moderate drinkers.[24] As Stringham (2009) puts it, "Raising taxes on alcohol to prevent problem drinking is akin to raising the price of gasoline to prevent people from speeding."[25]

In any case, many of the interventions assessed by Collins and Lapsley use incentives to discourage consumption, incentives presumably undone by the irrationality of harmful drinkers assumed by BERL. BERL cannot have it both ways.

BERL acknowledges the rough nature of their estimate at p. 69:

> *We use a simple approach: we assume that 50 percent of costs are avoidable and apply this to our estimate of total costs… This should be treated as an upper limit of potential avoidable costs, and not an exact figure.*

Finally, and perhaps most importantly, the enforcement costs of policies capable of reducing harmful drinking by up to 50% are missing from the avoidable costs analysis, a point also recognised by BERL (p. 70):

> *Single et al (2003) notes that estimates of avoidable costs do not indicate how these cost reductions might be achieved or whether the social benefits that result from these programs exceed their social costs.*

What is the use of a rough estimate of avoidable costs that carries with it no policy guidance, no assessment of benefits required for policy analysis, and no consideration of enforcement costs?

3.5. Conservative Where It Doesn't Matter

The word "conservative" appears frequently in the BERL report, but BERL is selective in its application. For example, BERL conservatively ignores the 1.6% of alcohol consumed in New Zealand produced in the home (p. 7) and ignores nursing costs caused by illicit drug use saying (for the latter) these costs were "excluded due to data limitations and in order to ensure a robust, but conservative, estimate." (p. 47)

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major increases in all of these programs could achieve anything close to a 50% reduction in alcohol related costs.

[22] See Miron and Zweibel (1991).

[23] See the Kaiser study, discussed in section 5.2.4 and a list of co-morbidity factors in section 4.2.

[24] See for example Chaloupka and Wechsler (1996) and Kenkel (1996), cited in Mast et al (1999).

[25] We thank Stringham (2009, p. 4) for the beautiful analogy.

Leaving to one side for the moment that BERL may well have assigned the wrong sign to its estimate of nursing home costs[26], BERL more importantly abandons conservatism where the effects are greatest, most notably in its decision to assign zero gross economic benefits to irrational consumers of alcohol and drugs, the most extreme assumption possible, in selecting a ridiculously high multiplier for value added from labour (see 4.2, below), and in selecting an estimate for the share of harmful alcohol and drug costs that are avoidable that was beyond the upper bound of its sources (see section 3.4). These estimates have effects for the headline figures in the billions of dollars.

3.6. Sensitivity Analysis Where It Doesn't Matter

In the Appendix to their report, BERL conducts a sensitivity analysis to test the effect of settings on headline figures. BERL tests a series of variables, finds only limited variation, and concludes, "…the estimates of harmful AOD use in 2005/06 are robust". The most sensitive variable is mortality rates, with a 10 percent increase in mortality rates leading to a 3.3 percent increase in estimated total social costs.

However, BERL does not test the effect of varying these important assumptions:

- setting gross benefits to harmful drinkers to be more than zero;
- setting the threshold for harmful drinking above 40 grams (1.8 pints of 5% beer); and
- a counterfactual that is something other than zero harmful drinking and drug use.

4. BERL Cost Analysis

4.1. Overview of Main Cost Contributors

We proceed now to our analysis of the costs attributed to the harmful consumption of alcohol in the BERL report. We find many serious problems in BERL's methodology and suggest changes that, in our view, make the BERL estimates more reasonable. These adjustments indicate BERL's cost estimate for harmful alcohol consumption is grossly overstated. We estimate actual net external annual costs of $146.3 million, a 96.9% reduction from BERL's figure of $4.794 billion in total costs. The main driver of this change is our focus on net external costs rather than including costs borne privately by harmful drinkers themselves. However, correcting only for errors other than inclusion of private costs reduces the BERL figure by a third. Again, we focus exclusively on the costs of alcohol alone for reasons of time; we expect that analysis of their costs of drug use would yield similar results.

Table 5.1 on p. 56 of the BERL report lists the social costs of harmful alcohol and drug use in 2005/06. We use this table to structure our discussion here: we take each cost item in turn and subject it to scrutiny. In Table 1 below we compare BERL's headline alcohol

[26] Harmful users of drugs and alcohol may well enter nursing care at an earlier age; they will, however, spend fewer years in such care if they also enjoy premature mortality. Net nursing home costs may be reduced rather than increased due to harmful alcohol and drug use.

costs to our corrected net external costs of alcohol use; details on the calculations follow in separate sections.[27] In both BERL's original calculation and in our adjustments, costs are calculated as the difference in total social costs between, firstly, a factual scenario in which harmful alcohol and drug consumption occurs as it did in the year 2005/6, and secondly a counterfactual scenario in which zero harmful alcohol and drug consumption occurs.

We note that the value of our corrections is necessarily approximate. BERL's report does not explain its calculations in full detail, its referencing and citation is poor, and BERL refused access to their background calculations. By contrast, all of our working calculations are being released simultaneously with our report.

Table 1: Net external costs of alcohol use[28]

	BERL	Corrected Net External Costs	Difference	Discussion Section
Tangible Costs				
Labour Costs	$1,478.4	$-126.7[29]	-108.6%	4.2 (4.2.1-4.2.10)
Drug production	$698.7	$0.0	-100.0%	4.3
Crime n.i.e	$562.2	$409.8	-27.1%	4.4
Health Care	$290.1	$254.8	-12.2%	4.5
Road Crashes	$200.1	$33.2	-83.4%	4.6
Excise taxes collected	.	**$-516**	.	**4.7**
Tangible Costs ($ million)	**$3,229.5**	**$55.1**	**-98.3%**	
Intangible Costs				
Loss of life	$1,519.6	$67.2	-95.6%	4.8
Lost quality of life	$42.4	$24.0	-43.4%	4.8
Intangible Costs ($ million)	**$1,562.0**	**$91.2**	**-94.2%**	
Total Costs ($ million)	**$4,791.5**[30]	**$146.3**	**-96.9%**	

[27] Since BERL's overstated figures on alcohol use are most likely to adversely affect policy formation, we here only work to correct those figures. We expect costs of other drug use to be equally inflated but correcting BERL's estimate on that dimension seems less currently important than preventing BERL's mistaken accounting of alcohol costs from entering into the alcohol policy review process.

[28] Here and throughout, please refer to our accompanying spreadsheet tabulating our revisions. The spreadsheet is available at http://www.econ.canterbury.ac.nz/personal_pages/eric_crampton/Alcohol.xls Table 1 derives from the tab "Summary tables totals".

[29] We find a net external benefit in this category. We find total external paid and unpaid labour costs of $173 million more than offset by external benefits of consumption resources saved of $299.7 million. See Table 2, below.

[30] Note: the total in the BERL column differs from BERL's reported total because BERL seems to count a 2 million dollar cost item twice: Road crash related lost output (temporary disability) counts under labour

Each of these cost items is taken up in turn, below, in the order in which they appear in Table 1, above. After preliminary discussion of the labour cost category in general, labour costs, the bulk of BERL's tangible costs, are discussed in ten subsections corresponding to the order in which they appear in BERL's Appendix Table 2 listing the subcategories of BERL's calculated tangible costs. We conclude by explaining why our corrected net external costs remain, in our view, an upper-bound estimate of net external costs.

4.2. Labour costs

Labour costs due to harmful alcohol use make up the bulk of BERL's calculated tangible costs: $1,478.4 million, which reflects the value of output that would have been produced but for premature mortality, excess unemployment, absenteeism, reduced productivity among drug and alcohol users in the workforce, and reduced household production caused by premature death, sickness, and reduced productivity in the factual scenario as compared to the counterfactual of no harmful use. BERL offsets these output losses by the benefit of consumption resources forgone: those suffering from premature death also fail to consume resources which then are available for consumption by others.

The first step in BERL's calculation is to compute the reduction in the population relative to the counterfactual scenario due to harmful alcohol and drug consumption. BERL imputes back to 1951 current mortality rates for alcohol and drug use, applying mortality adjustments to this additional population (someone who did not die in 1960 from a drug overdose may well have died of a normal heart attack in 1985, for example, and would not be in today's workforce), and summing up those who did die of alcohol or drug related issues but likely would still be alive today absent alcohol-related premature death. BERL uses estimates from Collins and Lapsley to estimate the proportion of deaths within different ICD-10 codes[31] attributable to drug and alcohol use. They note that while Collins and Lapsley provide negative fractions for some ICD-10 codes, meaning that alcohol use reduces mortality in that group, their focus on harmful use suggests a zeroing out of these fractions. In other words, BERL assumes that whatever health benefits are provided by alcohol use in reducing these kinds of deaths disappear once usage increases into the harmful range. This is a controversial claim. A metastudy by Corrao et al (2000), for example, finds that mortality risk from coronary disorder is declining through consumption levels well into BERL's high risk range: protective effect continues through 31 grams per day for women (with net harmful effect only beginning at 52 grams per day) and through 87 grams per day for men (with net harmful effect beginning at 114 grams per day). BERL calculates that some 17,796 people would have been alive in 2005/6 but for premature mortality due to harmful use of drugs and alcohol. BERL then distributes this additional population among full-time, part-time, and not working status based on averages for their age and gender.

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costs and is the difference between BERL's reported total costs of road crashes n.i.e. and the sum of that category's component parts.

[31] The International Standard Classification of Diseases and Health Related Problems, 10th revision.

To calculate the value of lost output in the factual scenario, BERL multiplies the number of hours their additional population would have worked by the average wages of this cohort, controlling only for age and gender.[32] BERL then multiplies wages forgone by 1.87 to arrive at the value of output forgone in the factual scenario, citing figures showing that GDP per full time worker is 1.87 times wages per full time worker; BERL argues then that the absence of a worker due to the above-listed conditions costs 1.87 times that worker's wages. This multiplication only makes economic sense under very restrictive and unrealistic conditions: Specifically, if labour is fully employed, so that a forgone worker cannot be replaced, and if capital is a perfect complement to labour, so that the marginal product of capital is zero when the worker is absent, then one could argue for applying the 1.87 ratio. Even in that case its use would be debatable: if the machine were absent, the product of the worker would similarly be zero - the sum of the marginal products is greater than one.[33] As example, imagine a firm with one machine and one worker with neither replaceable and both critical for production. The worker earns wages of $10 per period, the rental cost of the machine is $5 per period, and output per period is worth $18.70. BERL would apply the 1.87 multiplier to the worker's wages, but we equivalently could apply a multiplier of 3.74 to the rental cost of the machine. If either input disappears, there is no output. We could say that the marginal product of each of the worker and the machine is $18.70, because both are critical; total output of both together remains only $18.70.

Even assuming perfect complements and full employment in the counterfactual, it remains something of a judgment call whether all output should be tallied in favour of the worker. If we relax either assumption, the 1.87 multiplier is untenable. The assumption adds about $800 million to BERL's cost estimates, but BERL offers no justification for its presence; it is unclear that BERL recognizes the restrictiveness of the conditions required for the multiplier to be reasonable. In effect, BERL is allocating the surplus of production to labour, leaving none to capital.[34] If there exist unemployed labour resources, another worker will take the absent worker's place and the only reasonable multiplier would reflect frictional costs of finding new staff. If labour and capital are not perfect complements, then a firm with a missing worker could choose more capital-intensive production methods; again, the only reasonable multiplier would reflect the marginal losses of moving to the slightly less preferred production method. The conditions under which the assumptions justifying the 1.87 multiplier are justified seem least likely to hold in the parts of the labour market disproportionately staffed by those with serious alcohol or drug abuse problems: markets for lower skilled labour are less tight than those for more highly skilled labour, and such labour is more likely to be more easily substituted by more capital-intensive processes. It is particularly odd to apply such a multiplier to the costs of excessive unemployment facing unemployed heavy drinkers

[32] Of course, very heavy drinkers may differ from average characteristics even in the absence of drinking: risk factors for serious alcohol or drug use correlate with poor labour market conditions. This is taken into account below.

[33] The application of a scaling factor based on economy-wide averages also raises significant concerns about the use of average vs marginal costs.

[34] We discuss this in section 5.1.3.

who, even in the absence of alcohol, are more likely to be drawn from the lower tail of the labour distribution.[35] BERL considers none of this in its report: the 1.87 multiplier is simply applied to wages and BERL moves on.

A more realistic approach is to use a multiplier that reflects the findings of empirical studies of the relationship between value added per worker and wages. A multiplier in the order of 1.05-1.1[36] appears to represent a normal range for these estimates. To correct BERL's estimate, we reduce all labour cost estimates to 59% (1.1/1.87) of BERL's stated levels. We conservatively consider the "value added" component of 10% as being an external cost, noting that employers would attempt to internalise costs by applying a wage penalty to those expected to be higher cost due to alcoholism. To the extent they are successful, counting the full 10% markup on wages as external becomes excessive.

We turn now to an important aspect of alcohol and drug use that is largely overlooked by BERL, which is co-morbidity effects. Research suggests that factors such as mental illness or other personality disorders tend to predispose individuals both to adverse labour market outcomes and to harmful use of drugs and alcohol. By ignoring this, BERL overestimates the mortality and lost output costs of alcohol and drugs. 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[37] disorders tend to predate alcohol use disorders. 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. Bowden (2005) notes that unemployment among those with bipolar disorder ranges around 60%. Pirkola et al (2005) find 20% of Finish alcoholics have a comorbid depression, anxiety, or combined depression and anxiety disorder. Lerner et al (2004) find that those with depression have unemployment outcomes six times higher than a control group and that the employed depressed experienced impaired job performance: lower productivity. Workers with major depression enjoyed median incomes 19% lower than those in the control group. All of these results suggest BERL's naïve estimation approach, which ignores these correlated disorders, significantly overstates what elimination of harmful alcohol and drug use can achieve.

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[35] Heavy use of alcohol is highly correlated with other psychological disorders which hurt labour market performance: see below.

[36] See for example Wolf (2004:176) who cites empirical evidence from the World Bank on the relationship between value added per worker and wages.

[37] A standard listing of psychological conditions, the Diagnostic and Statistical Manual of Mental Disorders.

Table 2: Lost output due to harmful alcohol use

	BERL's listed cost	Corrected cost[38]	Corrected cost with correction for adverse prior conditions	**External cost: policy relevant costs**	**Discussion section**
Market Labour					
Reduction in workforce	459.2	270.1	262.5	31.4	4.2.1
Net excess unemployment	877.5	152.7	122.2	11.1	4.2.2
Workplace losses due to absenteeism	36	21.2	16.9	1.5	4.2.3
Workplace losses due to reduced productivity	33.9	19.9	16	1.5	4.2.4
Losses due to injury n.i.e	126.9	139.6	139.6	34.3	4.2.5
Total paid labour costs	**1533.5**	**603.5**	**557.2**	**79.8**	
Household Labour					4.2.6
Premature death	53.7	53.7	53.7	0	
Sickness	1.7	1.7	1.7	0	
Reduced productivity	2.3	2.3	2.3	0	
Road crash related lost output	2	0.9	0.9	0.2	4.2.7
Crime related lost output					4.2.8
Victims of crime	156.9	92.3	92.3	92.3	
Prisoners	36	17	8	0.7	
Home detainees	0.7	0.3	0.2	0	
Total paid and unpaid labour costs	**1786.8**	**771.7**	**716.3**	**173**	
Less consumption resources saved	-308.4	-308.40	-299.7	-299.7	4.2.9
Total net labour costs	**1478.4**	**463.3**	**416.6**	**-126.7**	**4.2.10**

[38] We here correct for BERL's use of a 1.87 multiplier rather than a more accurate 1.1 multiplier and for other problems in BERL's method unrelated to our assumption of co-morbid psychological disorders that would have reduced output in the counterfactual regardless of alcohol use. The next column adds the adjustment for co-morbid psychological disorders, as discussed previously: we assume 20% of harmful drinkers have comorbid conditions predisposing them to higher unemployment and lower wages. See tab "Appendix Table 2", and supporting tabs "Workforce reduction" through "Consumption Resources Saved" of the spreadsheet at http://www.econ.canterbury.ac.nz/personal_pages/eric_crampton/Alcohol.xls

To correct for BERL's overestimate, we follow Pirkola et al (2005) in assuming that 20% of our sample has comorbid depression that would continue to exist in the absence of alcohol consumption, that those in this group (Lerner et al, 2004) have unemployment rates six times average (27% rather than 4.5%), and those employed in this group have earnings 19% lower than average (Pirkola et al, 2005). This approach underestimates the total effects of comorbid psychological conditions because it counts only one such condition; however, we cannot find sufficiently reliable data on other conditions; we also do not adjust for premature mortality due to underlying psychological conditions. Our slight adjustment for prior conditions accounts for $55 million of the cost difference between our corrected costs and BERL's listed costs; it accounts for almost none of the difference between our final external cost figure and BERL's total costs figure as lost output is a cost internal to the drinker.

A rough correction for cohort differences and for proper multiplier application reduces overall costs of lost output by more than two thirds, as detailed below: the difference between the first and third cost columns in Table 2, above. More fundamentally, BERL's costs of lost output rely on two further unwarranted assumptions. First, and less importantly, BERL implicitly assumes full employment: in the alternative, unemployed workers take the place of those suffering premature alcohol-related mortality and only frictional costs are incurred: output is only lost in the interval until a replacement worker is hired. Second, and more importantly, costs here incurred are internal to the individuals involved: the drinker bears the cost of his increased mortality risk, increased probability of unemployment, and reduced wages.[39] The final column in Table 2 lists that portion of each item's costs which are truly external to the drinker himself. Only external costs are of policy consequence if the government worries about efficiency considerations; costs borne by the drinker himself may be relevant if the government wishes to act paternalistically, but are not supported by economic analysis without strong assumption. We now take each labour cost component in turn.

4.2.1. Labour costs of market output: reduction in workforce

BERL takes as counterfactual that those currently engaging in harmful drug or alcohol use are otherwise identical to the general population; if a reasonable fraction of those whose harmful drug use results in death had pre-existing mental illnesses that would have adversely affected their labour force status absent such drug use, then the counterfactual greatly overestimates the costs of alcohol use, as noted above at 4.2.

BERL uses median earnings per hour from the June 2006 quarter Income Survey and the number of hours worked from the 2004 Household Labour Force Survey. We use the 2006 Statistics New Zealand publication "Labour Market Statistics" for both, then scale total earnings to match those used by BERL. BERL finds that, but for harmful drinking, the full time labour force would increase by 5476, part-time by 1461, and the sum of the unemployed and those not in the labour force by 7240. We first separate from this total those who died in car accidents: 18% of each group. Many, but not all, who die in drink-driving related road accidents are either the car's driver or other passengers. Stringham (2009) cites American data from the National Highway Traffic Safety Association that

[39] Save, of course, for mortality costs to external parties caused by drink-drivers; these costs are assigned to the external category, as discussed below.

83% of those killed in drink-driving accidents are persons within the vehicle. We assume that those within the drink-driver's vehicle share similar labour market characteristics with the drink driver while the 17% external to the vehicle have average labour force characteristics. We then tally forgone earnings by harmful drinkers by assuming that 80% of harmful drinkers have average labour force characteristics and earnings while the remaining 20% have adversely affected labour force characteristics as described above. Total forgone earnings are some $239 million. We use a multiplier of 1.1 on forgone earnings rather than BERL's preferred 1.87 to arrive at a total cost of $262.5 million.

The majority of the costs of forgone earnings are internal costs rather than external. Lost earnings by external victims of car accidents are counted as external costs, as is the ten percent "value added" multiplier applied to all earnings. External policy-relevant costs total $31.4 million.

4.2.2. Labour costs of market output: excess unemployment

The second component of costs of lost output is workforce losses due to excess unemployment. BERL cites Rayner et al (1984) as showing excess unemployment due to alcoholism as being 10%: they interpret Rayner as arguing that high risk drinkers enjoy an unemployment risk ten percentage points higher than average (the difference between 4% and 14%). However, what Rayner et al show is that our overall unemployment rate is 10 percent higher than it otherwise would be: in other words, the difference between 4% and 4.4% unemployment. 92,000 individuals were unemployed in 2004; BERL says excess unemployment due to high risk drinking affected 27,200 full time and 3,900 part time workers. They then argue that a full third of our unemployed were high risk alcohol drinkers who would have been employed but for alcohol use. This is implausible. We correct BERL's figure by applying the 10% figure to the number of unemployed in 2004 to arrive at excess unemployment of 9200. We then reduce BERL's listed costs proportionately before applying an adjustment, as described above, to account for that a fifth of that population would enjoy adverse labour market characteristics even absent alcohol use. We apply the 1.1 multiplier rather than BERL's preferred 1.87 to arrive at total costs of $122 million: $111.1 of which is internal to the drinker and $11.1 of which is external.

We note that the literature on the labour market effects of alcohol consumption is ambiguous. Dave and Kaestner (2002) find that alcohol use does not adversely affect labour market outcomes; section 5, below, details other confounding literature. We take BERL's argument as given that alcohol use has deleterious employment effects, but we caution that such findings are not uncontested.

4.2.3. Labour costs of market output: absenteeism

BERL counts workplace losses due to alcohol-related absenteeism as totaling $36 million. We adjust this figure downwards by applying the lower multiplier, bringing costs down to $21 million, and by adjusting for those with comorbid conditions would have had heightened absenteeism regardless of alcohol use, bringing total costs down to $17 million. Lerner et al (2004) find those with major depression miss on average 1.9 days of work per fortnight (as compared to 0.7 days for the control group) and have an average productivity loss score four times higher than that of the control group; again, those with major depression are more likely to become alcoholics. BERL does not list

the number of days per week harmful drinkers are deemed absent from work, referring the reader instead to Pidd et al 2008 who report average absenteeism levels for many different categories of drinkers. It would be consistent with BERL's method, though their actual method is unstated, to count the average days absent for hazardous (1.3 days per 12 months) and harmful (2.6 days per 12 months) drinkers. Lerner (above) noted excess absenteeism rates from depression of 1.2 days per fortnight, or 31 days per year. If we continue to assume that a fifth of harmful alcohol users have underlying psychiatric disorders, absenteeism consistent with those disorders would swamp any alcohol-related absenteeism: Pidd et al do not control for such disorders.

4.2.4. Labour costs of market output: reduced productivity

BERL counts reduced productivity among harmful alcohol users as costing $33.9 million. We begin by adjusting this downwards to correct the multiplier, bringing costs to $20 million. BERL estimates that the top ten percent of high risk drinkers experience about 3.93 days per year of reduced work performance, on average, and that productivity on those days is reduced by 25%. Lerner (above) notes a non-absenteeism productivity loss among those with major depression of 7.5% as compared to a control group; we consequently would expect a quarter of high-risk drinkers to exhibit daily productivity losses of this magnitude. BERL counts as productivity costs approximately one full day per year for high risk drinkers; 20% of this group would experience productivity losses equivalent to 18 days work based on underlying characteristics, swamping any effects of alcohol. We consequently further reduce BERL's estimate to $16 million.

4.2.5. Labour costs due to injury not elsewhere included

BERL elsewhere tallies the costs of alcohol-related injury; here, they add in the costs of reduced production due to alcohol-related injury. These costs are discussed at p. 126 rather than in sequence with other labour market costs. We cannot determine from their discussion whether the standard 1.87 multiplier was applied, but it seems not to have been. We consequently adjust upwards BERL's listed costs from $126.9 million to $139.6 million. Nothing in the BERL report allows us to determine the external and internal allocations of this cost item: some costs will be borne by alcohol users, and some by external parties. We consequently follow data described earlier suggesting that 17% of drink-driving fatalities are borne by non-occupants of the drink driver's car.

BERL bases its estimate of this item on ACC payments to accident victims, which raises an interesting methodological point. Any tallying of costs should include either the insurance costs or the amounts paid out: not both. If we were, for example, tallying the costs of Hurricane Katrina in the US, we could either measure the total property damage caused by Katrina, or the costs to insurance companies of such damage; we would be double-counting if we were to include both. Similarly, we can either count the administrative costs of ACC (which are factored into ACC premia), or we can count the realized payments; we cannot count both. BERL counts both: insurance company administration appears later as a $132 million dollar cost item while property damage and ACC-compensated lost income appear as other costs. We consequently later drop insurance administration as a cost item.

4.2.6. Labour costs of household output

On this item, we take BERL's costs as given and simply note that they are internal to the individual rather than external. We assume that BERL has not applied its 1.87 value added multiplier to this figure; if it has, then actual costs are 59% of those listed. Application of productivity multipliers for underlying heterogeneity will have only second order effects on these totals. We would note, however, that if harmful alcohol use causes net excess unemployment, it may increase the opportunity for provision of household output while reducing productivity in that sector. The net effect of harmful drinking on household labour would then be ambiguous.

4.2.7. Road crash related lost output (temporary disability)

Table 2 lists costs of $2 million for this item. However, the only discussion of this item, at p. 122, lists these costs as being $900,000. If the $900,000 figure is correct, downwards adjustment for correct multiplier application reduces costs to $530,000; if the $2 million figure is correct, the adjusted cost would be $1.2 million. We list adjusted costs of $900,000 as a rounded average of these figures. Internal and external allocation of costs follow the previous assumptions about the proportion of road crash victims external to the vehicle.

4.2.8. Crime-related lost output

Crime related lost output of $195.6 million includes lost output of victims ($156.9 million) and lost output of prisoners and home detainees ($36.7 million). Lost output of crime victims is a plausible external cost of crime; lost output of prisoners seems a cost borne by the individual.

BERL estimates the contribution of alcohol to offending by use of surveys of prisoners. In the survey, prisoners 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 certainly is possible that harmful alcohol use can contribute to criminal offending. But is it plausible that everyone answering "some" to this question would not have committed the offence? We do not have access to BERL's survey data and consequently assume equal thirds across the three response categories. We then reduce BERL's crime costs by a third across categories other than drink-driving: it is implausible that a large proportion of crimes where alcohol is listed as having contributed "some" to the offence would not have been committed in the absence of alcohol. Overall crime costs are then reduced by 20%.[40]

BERL estimates prisoners' lost output by assuming that prisoners share identical labour force characteristics to the averages for persons of same age and gender. This of course manifestly overstates these costs if prisoners typically have worse labour market characteristics than those not in jails. Giles and Le (2007) survey the literature and discuss results for a sample of Western Australian prisoners. In short, those in prison (unsurprisingly) differ systematically from others prior to those prisoners' current spell of incarceration. In the Western Australian sample, prior to incarceration only 18% were

[40] Please refer to tab "Prisoners' Lost Output" of the accompanying spreadsheet.

employed in high skilled occupations; in a region with an employment rate of 93% for those in the labour force, only 44% of those in prison who were in the labour force four weeks prior to incarceration were then employed. Other literature cited by Giles and Le suggests poorer physical and mental health, poorer education, and poorer employment histories. Estimating prisoners' lost output by applying wage figures adjusted only for age and gender severely biases results. Again, without doing a rather extensive amount of unpaid data work, it would be difficult to precisely quantify effects; following Giles and Le's figures on relative employment rates, we deem prisoner output to be likely to be 47% of those not incarcerated. Correcting the multiplier and reducing the proportion of crimes fully attributable to alcohol, as described above, brings costs down from $36.7 million to $17 million; correcting for individual heterogeneity brings it down further to $8 million.

The above figure remains an overestimate of the costs of forgone prisoner labour if the value of work performed by prisoners in prisons is not included. BERL does not include this figure, arguing that prisons only pay prisoners trivial amounts ($1 per day) not worth considering. That prisons effectively offer slave labour rates is not an argument against considering the value of the slaves' work; however, without a market wage, we cannot calculate the value of prisoners' labour. BERL notes that, at the $1 per day rate, if all 3,553 alcohol-and-drug-attributable prisoners worked every standard working day, their pay would total only $817,000. Of course, the value of work performed under duress need not approximate wages paid. If prisoners' work were worth $50 per day, this figure would of course be fifty times higher: $40 million. We would then need to adjust that figure downwards for the fact that BERL overestimates the fraction of crimes for which alcohol was a necessary contributor: $32 million. Prison labour would need to be worth only about $12 per day for the value of prison labour to swamp the costs of lost prisoner output.

We adjust downwards the value of lost output from crime victims only to account for BERL's 1.87 multiplier and for that fewer crimes are wholly attributable to alcohol than BERL assumes.

4.2.9. Consumption resources saved

BERL nets from its total paid and unpaid labour costs of harmful alcohol use consumption that would have occurred but for the premature death of drinkers, reducing its total costs from $1,786.8 million to $1,478.4 million. BERL views this consumption forgone as a benefit for everyone else who then has more resources available to consume. While this is the case, it remains entirely a pecuniary externality: every dollar's worth of benefits to others is matched by a dollar's worth of costs to the drinker suffering from premature mortality. We adjust the figure downwards to account for cohort heterogeneity as described above: if those suffering from premature mortality from harmful alcohol use had negative labour market characteristics, they similarly would enjoy proportionately less consumption as earnings would be lower. We then add this figure as an internal cost equal in magnitude but opposite in sign to the external benefit. We note that this may induce double-counting of costs if these losses are also included as intangible costs of premature mortality; however, we then wonder whether including both output forgone and an intangible measure of value of life would not similarly involve double counting. If it does, our measures of costs here remain overstated.

As we will do many times in this analysis, we will here flag an item that should not be counted as an efficiency cost (or benefit) of harmful drinking as it constitutes only a pecuniary matter. An alternate measure discounts all pecuniary externalities, both positive and negative; such an accounting is provided in 4.9, below.

4.2.10. Total net labour costs

BERL finds total net labour costs of $1,478.4 million. Correcting for errors in BERL's method, as described above, this figure reduces to $463.3 million. Correcting further to isolate external costs, the figure reverses sign: we find external benefits of $126.7 million: external benefits of consumption forgone outweigh external costs.

4.3. Alcohol production costs

BERL deems half of all alcohol sold in New Zealand to be harmfully consumed; they consequently list the value of that alcohol as a cost: a wasted real resource. We note first that BERL seems to have calculated this value incorrectly. As best we understand BERL's method, any consumption less than 40 grams for men (20 grams for women) is left entirely to one side; however, the 40th gram of alcohol pushes the drinker into the harmful category. At that point, all consumption is then counted as a cost, not just the portion of consumption above the threshold. BERL's counterfactual ought to bring these drinkers just below their gender-respective thresholds for harmful drinking, not to zero.

We first remove from BERL's drug production costs excise taxes collected; alternatively, they could have been left in as an internal cost with a corresponding external benefit. However, we prefer to tabulate excise taxes on their own and so net them from the figure here presented and include them instead as a separate line item at 4.7. We then correct BERL's figure to account only for that proportion of alcohol consumed above the harmful drinking threshold by harmful drinkers. We take the range midpoints reported by BERL for harmful and hazardous consumption and net out quantities below the harmful thresholds, adjusting for age and gender consumption patterns reported by BERL. Netting out excise taxes and harmless consumption reduces BERL's production costs by more than two-thirds: from $698.7 million to $215 million. We note that all of these costs are internalized by the drinker: there is no external cost.[41]

4.4. Crime costs

As was the case in adjusting BERL's costs of income forgone due to excess imprisonment, we here adjust downwards costs to reflect a more realistic assessment of the proportion of crimes that would have been eliminated absent alcohol use. Total costs reduce from $562.2 million to $409.8 million, all of which are external. Details are provided in Table 3, below.

We adjust police, court, community expenditure, and lost property costs using the same method as described in section 4.2.8, above.

Costs of preventative expenditure require greater adjustment. This item is nowhere explained by BERL. A cursory footnote says it comprises expenditures on security

[41] See tab "Diverted inputs" of the accompanying spreadsheet.

alarms, fencing, deadlocks and the like. Presumably BERL has assumed costs on such things would go down proportionately with crime reduction due to elimination of harmful alcohol use. BERL's presumed assumption seems unlikely to hold. Many of these expenditures are fixed costs, not marginal. It is plausible that some individuals would choose to reduce the vigilance of their alarm companies were crime to decrease, but decreased preventative measures would be met by increased opportunistic property crime. Expenditures on preventative measures would not decrease proportionately with a decrease in alcohol-related crime; furthermore, BERL cites no evidence that the elasticity of preventative expenditures with respect to crime rates is unitary. With similar authority, we assert it to be 0.5: a 1% decrease in costs due to alcohol-related crime results in a 0.5% reduction in expenditures on crime prevention. We first adjust costs downwards in the same way as other cost items in this category, then apply our asserted elasticity figure of 0.5.

Table 3: Costs of Crime[42]

	BERL's listed costs ($ millions)	Adjusted costs of crime ($ millions)
Customs	0.1	0.1
Police	172.2	138.6
Defence force	0	0
Criminal courts	64.5	51.9
Prisons	112.3	90.3
Community sentences	18.7	15
Preventative expenditure	61.3	24.7
Property lost	133.1	89.2
Total Crime n.i.e.	**562.2**	**409.8**

4.5. Health costs

We adjusted downwards BERL's cost of treatment for victims of crime in line with previous reductions in the crime category, from $97.8 million to $78.7 million. Other categories we do not adjust. BERL's listed primary medical care costs are not well documented. GP visits for alcohol and other drug users are listed at p. 59 as totaling $52 million, with other primary care services for the mixed group totaling $18.7 million. In assessing internal and external costs, we assume that subsidies cover two thirds of the cost of GP visits for this category and that all other primary care services are publicly provided.

As noted earlier, Corrao et al (2000) provide reasonable evidence of health benefits of alcohol consumption extending well beyond the hazardous threshold used by BERL; no health benefits are counted by BERL. Net health care costs of "harmful" alcohol use will consequently be rather lower than those cited by BERL. However, putting a value on this would require serious research beyond what we here are able to do. We note also that while BERL assigns a value to the reduction in GP costs associated with alcohol-related premature mortality, they do not adequately consider changes in nursing home costs

[42] See tab "Crime" of the accompanying spreadsheet.

which may be reduced more by premature alcohol-related mortality than augmented by earlier admission.

External health care costs total $254.8 million.[43]

4.6. Road crashes not included elsewhere

BERL discusses cost items in this category at pages 122 and 123. Alcohol-related road crashes there are listed as causing $7.8 million in property damage. Later tables list the cost as $21.7 million; we cannot explain the discrepancy. Similarly, travel delays are listed at p. 123 as costing $8.6 million; the tables list the cost as $26.8. Fire and emergency services are listed as costing $6.6. million at p. 123 but as costing $19.4 million in the tables. We take the average between the two figures in each case. Following NHSTA data cited by Stringham (2009), we apportion 83% of property damage as internal and 17% as external.

More substantially, we adjust downwards BERL's insurance administration costs to zero. As previously discussed at 4.2.5, we cannot count both insurance costs and the costs of insurable damage if we wish to avoid double counting.

Total costs for this category drop from $200.1 million to $45.5 million, of which only $33.2 million are external.[44]

4.7. Excise taxes

We count all collected alcohol excise taxes as an external benefit of harmful alcohol consumption matched by internal costs to drinkers themselves. Alcohol is apportioned an excise tax because of the potential for external costs by excessive users. Excise taxes on alcohol, as recognized in the Barker (2002) review of alcohol costs, will always overcharge those who impose few costs and undercharge those who impose many costs if those taxes on average cover the external costs imposed by heavy drinkers.

BERL leaves these taxes out of their primary analysis. Excise taxes form a part of BERL's listed costs of diverted inputs, but the benefits of collected taxes show up only in BERL's separate calculation of costs to government at p.130. It is interesting to note that BERL counts only that portion of taxes paid on consumption above the harmful threshold when counting revenues that would be forgone if harmful alcohol consumption were eliminated but, when compiling the resource costs of harmful usage, counts all alcohol consumed by harmful users rather than only that portion above the threshold.

Treatment of excise tax revenues is a rather difficult issue. The government benefits from collected taxes while drinkers pay a corresponding cost. The collected taxes then are a pecuniary externality rather than a technological externality: the benefits to government are matched by costs to those paying taxes. The role of these kinds of fiscal externalities will be discussed below at 4.9. We can either take the approach of discounting all fiscal externalities as being of zero efficiency consequence, as Browning (1999) would recommend; or, we can tabulate the relevant ones, along with our worries

[43] See tab "Health" of the accompanying spreadsheet.

[44] See tab "Road crashes n.i.e." of the accompanying spreadsheet.

about their inclusion. We follow the latter course. It would be strictly wrong, however, to count only negative fiscal externalities while ignoring positive ones.

We do not consider the excess burden imposed by alcohol taxes: the dead weight loss brought about by the tax wedge that separates marginal benefit from marginal cost. The costs of the excess burden of taxation are properly viewed as a cost of tax policy rather than as a cost of harmful alcohol use. We make note of the importance of and difficulties involved in this issue at section 4.9, below.

Alcohol excise taxes amounted to $516 million in the 2005/06 fiscal year. We count this full amount as a negative external cost (an external benefit) matched by internal costs to drinkers. Taxes collected on harmfully consumed alcohol total $125.9 million; taxes collected on harmlessly consumed alcohol total $390.1 million. The counterfactual we assume is that excise taxation would continue even if all harmful drinking were to cease. This also is the counterfactual employed by BERL in tabulating its version of the costs to government revenues were harmful alcohol consumption to cease. An alternative approach would be to assume that excise taxation would cease if there were no harmful drinking. If the point of excise taxes on alcohol is to offset costs generated by harmful drinkers, then the rationale for those taxes would disappear in the counterfactual. In that case, we would deem the taxes paid on harmlessly consumed alcohol to be an external cost imposed upon harmless drinkers by harmful drinkers through the tax system: a negative fiscal externality.[45]

This category completes the assessment of net tangible costs. Where BERL finds total tangible costs of $3,229.5 million, we find net external tangible costs of $55.1 million: about two percent of BERL's figure.

4.8. Intangible costs

BERL tallies intangible costs from loss of life and lost quality of life. For the most part, we have little objection to the value of statistical lives used or the method of assigning values to pain and suffering. A better analysis would net from the costs of premature mortality those individuals whose lives were saved due to alcohol use: again, alcohol consumption even well into BERL's harmful range can help prevent death from coronary heart disease (Corrao 2000). These lives saved are no less valuable than are the lives lost through abuse of alcohol. However, putting together a reasonable figure assessing the number of lives so-saved is beyond the scope of this analysis. The only substantial downwards revision is the reduction we've implemented elsewhere: not all crimes counted by BERL would have been prevented in the absence of alcohol.

Where we differ from BERL is on the apportionment of these costs between socially relevant external costs and costs internal to the individuals involved. Loss of life or of quality of life due to crime or road crashes affecting external parties are obviously external costs of alcohol use and correctly count as policy-relevant; premature death caused by one's own excessive use of alcohol is not an external cost of alcohol use. We find that of the $1,550.5 million of adjusted total intangible costs, only $91.2 million

[45] See tab "Excise taxes collected" of the accompanying spreadsheet.

truly counts as an external cost.[46] The vast bulk of these intangible costs fall on the drinkers themselves and so are not relevant for policy purposes.

4.9. Summary of costs and policy implications

Where BERL argues that alcohol imposes costs of some $4,791.5 million on society, we find that truly external social costs are only $662.3 million and are roughly matched by alcohol excise tax revenues of $516 million. Net external social costs are then $146.3 million: more than an order of magnitude lower than BERL's figure.

In order of importance, external costs are generated by crime, including medical treatment and lost output of crime victims ($605.9 million), health care ($176.1 million), lost output and loss of life for those killed or injured in car crashes by harmful drinkers ($108.5 million) and lost value added from other forgone production ($71.5 million); from that total we net excise tax revenues of $516 million and forgone consumption of $299.7 million. This suggests that dealing with the external costs of harmful alcohol use must begin by looking at mechanisms for reducing the costs of crimes for which alcohol was a contributing factor; it also suggests that net external costs are not all that great. Our finding is consistent with Barker (2002) who found that collected excise taxes in New Zealand at the time roughly approximated external costs of harmful alcohol use.

An alternative way of dividing the external costs is between those best described as pecuniary and those best described as technological. Economists distinguish between the two because only the latter has efficiency consequences. We here rely on the definition provided by Buchanan and Stubblebine (1962): pecuniary externalities are ones where the effect is felt only through the budget constraint, while technological externalities enter the utility or production function directly. Fiscal externalities are a form of pecuniary externality where the cost (or benefit) enters the budget constraint via the tax system (see Browning, 1999). Using this definition, the majority of external costs are pecuniary rather than technological: lost output, alcohol production costs, costs of crime prevention, health care costs, most road crash costs and excise taxes collected all count as pecuniary; intangible costs of loss of life and of lost quality of life enter directly into the utility function as would travel delays caused by road crashes. By that measure, we would deem net efficiency-relevant external costs of alcohol use as being $108.9 million: the total of external intangible costs of loss of life and lost quality of life and tangible costs of traffic delays. All other tangible monetized costs (and benefits) are pecuniary rather than technological as they affect external parties only through the budget constraint.

It is perfectly reasonable to prefer a cost measure that includes both pecuniary and technological externalities rather than only technological externalities: if we care about total imposed net external costs rather than just those of efficiency relevance, the former measure is preferable. However, if we count external pecuniary costs, we must also count external pecuniary benefits like collected tax revenues. Whether we include pecuniary items or not, the two measures differ by less than $40 million; given the rather rough approach we've necessarily taken, we would not deem the values to be statistically

[46] See tab "Appendix Table 3" of the accompanying spreadsheet.

significantly different from one another. By either measure, policy-relevant costs are less than five percent of the costs reported by BERL.

We do not take a policy advocacy role in this report; rather, we wish to point out that the analysis provided by BERL is wholly insufficient to form the basis for policy. We would note that any proposal for increased alcohol taxes would need to deal seriously with issues raised in this section. The bulk of the costs of any tax increase, including excess burden, will fall on alcohol consumed harmlessly. We have nowhere tabulated the benefits to moderate drinkers of moderate drinking; the loss of such benefits would have to be accounted for in any recommendation for increased alcohol taxation.

Moreover, any call for an increase in alcohol taxation would need to deal seriously with the issue of the excess burden of taxation. Such an assessment would prove rather involved. First, as excess burden measures the distortion in behaviour generated by the tax wedge, such a measure would be viewed as a benefit rather than as a cost when applied to harmful drinkers: the point of excise taxes is to reduce harmful consumption or, in other words, to induce an excess burden. The excess burden imposed upon moderate drinkers would then be viewed as "collateral damage", the costs of which would need to be netted from any calculated benefits. Since the evidence suggests that moderate drinkers are more price sensitive than are heavy drinkers,[47] the excess burden of any given tax increase will be larger for moderate drinkers than for heavy drinkers. Second, for marginal "harmless" drinkers, only the portion of the excess burden applying to their counterfactual consumption below the harmful threshold should count negatively. For those drinkers, a portion of the excess burden would be a benefit while the rest would prove a cost. Finally, an assessment of excess burden would need to consider to what extent the measure of excess burden already counts health benefits forgone by moderate drinkers in reducing their drinking below the optimal level of drinking because of the tax. We would argue that, to the extent that there are external health costs of harmful drinking, there are also external health benefits of moderate drinking that would not be incorporated into the measure of excess burden.

Simply pointing out that external costs are slightly higher than taxes raised is insufficient basis for an increase in alcohol taxes. At the margin, an increase in taxes can do more harm than good by imposing costs on moderate drinkers that outweigh any purported benefits from reduced harmful drinking. Without a thorough cost-benefit analysis that takes seriously benefits to moderate drinkers, we simply cannot conclude that a tax increase is an appropriate solution.

5. Other Issues

The BERL report can be reasonably considered a New Zealand application of a methodology applied in Australia by Professor David Collins and Professor Helen Lapsley (2008a). BERL cites reports by these two authors over 100 times, far more than any other authors. BERL has publicly drawn attention to the external peer review of its

[47] See footnote 24.

report apparently in an attempt to signal quality.[48] Those external reviewers are Professors Collins and Lapsley.

Both Collins and Lapsley (2008a) and (2008b) have been the subject of severe criticism by Australian consulting firm Access Economics in work commissioned by the National Alcohol Beverage Industry Council. In their review of Collins and Lapsley (2008a), Access Economics (2008a:iii-iv) concludes:

> *Overall the report is poorly structured with inadequate cross-referencing, there is a paucity of supporting evidence and references for claims, the referencing is incomplete and there is a very serious lack of transparency in calculation processes. Methodology and data used are singularly poor. There is apparent upward bias in most of the cost estimates and uncertainty is not dealt with due to grossly inadequate sensitivity analysis. Using a best possible approach would exclude one cost item, making the overall cost of alcohol abuse at least 18% lower. The other findings of the report should be viewed with substantial scepticism.*

On Collins and Lapsley (2008b), Access Economics (2008b:i-iv) concludes:

> *The most common approach… [is] cost benefit analysis (CBA) and cost effectiveness analysis (CEA). However, neither of these techniques is adopted in the report and, notably, the costs of the interventions are not estimated. To estimate gross benefits without estimating costs is likely to provide spurious conclusions – if costs outweigh benefits there may be no net benefit in any of the interventions reviewed. It is thus dubious how the information can assist in developing evidence-based strategies…There is no discussion of the literature review process…[c]ertainly the literature is much broader than the eight studies mentioned. Even then, only one study is used to provide evidence, with no good reason given for its use. Moreover, this particular study does not provide objective comparisons of interventions such as a league table of ICERs2 or benefit/cost (B/C) ratios (as would be expected), but instead provides a subjective 1/2/3-star rating system. Included interventions have been tried historically with some degree of gross (not net) benefit, an approach likely to embed historical mistakes in future policy.*
>
> *Methods used to select so-called effective interventions are problematic and out of line with standard practice. Unreferenced claims are made that certain interventions are 'world best practice', 'proven-effective', or 'very cost-effective', without evidence. Important issues are raised such as the treatment of combination policies and the risk that some policies will reduce benefits as well as costs of consumption – yet these are ignored, thus overstating the potential benefits of the selected interventions.*
>
> *In our view, there are fundamental flaws in the methods used in this Collins and Lapsley (2008b) report and hence in its recommendations.*

While that report was commissioned by the alcohol industry, our report is not. Access Economics' criticisms of the reports by Collins and Lapsley parallel many of our criticisms of the BERL report.

[48] See the comments section of http://www.tvhe.co.nz/2009/04/27/alcohol-regulation-economists-would-do-it-better/ The report's lead author notes he was commenting in a personal capacity.

5.1. Economic Deficiencies of the BERL Report

BERL claims that their study is of economic costs, but it is really a flawed accounting exercise. The economic literature on alcohol and drug consumption, its causes and social effects, and the effectiveness of various policy responses is extensive, published in the most prestigious economic journals, and largely ignored by BERL. Instead, BERL's fifteen page literature review mostly draws of a limited number of commissioned reports written by a small group of health economists, most frequently Collins and Lapsley – the external reviewers of BERL's report.

The contrast in rigour between the published economic literature and the BERL report is stark. Our perusal of the economic literature on alcohol and drug use in preparing this review impressed on us the truly complex nature of alcohol and drug problems. Missing from BERL's report are important ideas such as the complex relationship between alcohol and drug use, alcoholism as a symptom of deeper problems, the unintended consequences of regulation, the effectiveness of public policy and various subtleties and controversy in econometric modeling of those effects, theory and evidence for rational addiction, the drivers of demand for alcohol and drugs, the use of appropriate cost definitions, comorbidity between alcohol and drug use and psychological disorders and the extent to which alcohol or drug use can constitute self-medication for prior psychological disorders. All of these ideas, missing from the BERL study, are of critical importance to policymakers concerned with designing effective policies. In what follows we highlight some particular economic deficiencies of the BERL report.

5.1.1. Confusing Costs With Welfare

BERL repeatedly claims their study of costs is a study of welfare, potentially creating confusion among readers. When costs and benefits are changing, as will generally be the case in the regulation of alcohol and drugs, changes in welfare cannot be reliably detected by reference to costs or benefits alone. The following examples suggest BERL is confused on this point:

- "The focus of the study is on the harmful effects of drug use, that is, use that results in a net social cost. This reflects that society, as a whole, has fewer resources and less welfare than in the absence of harmful use." – p.1
- "Harmful alcohol use in 2005/06 cost New Zealand an estimated $4,794 million of diverted resources and lost welfare." – p.1
- "[costs-only] is likely to give an informative picture of the total impacts of harmful drug use" – p. 29
- "We define harmful AOD use as use that results in a net social cost. That is, society as a whole has fewer resources and less welfare"[49] – p.7

[49] BERL's quote is quite misleading. In referring to net social cost, BERL does not mean the difference between benefits and costs, as might be inferred from the reference in the next sentence to welfare, but costs net of small offsetting costs from, for example, higher mortality reducing later health costs.

5.1.2. Mortality and Non-Paid Employment

In fn 32 p. 34, BERL argues that early mortality deprives the country of people's services in non-paid employment, saying this "reduce[s] a country's capacity to support itself."[50] It is not the total welfare or total production which matters; rather, our well-being is judged on per capita measures. US citizens are not usually understood to feel 100 times better off because their nation's GDP is that much greater than New Zealand's. Since an early death changes both the top and bottom line of a per capita production measure, early mortality has a muted effect expressed per capita. If the consumption of non-paid services is deducted from the value of lost production, then we speculate the effect of early mortality on non-paid services is approximately zero.

5.1.3. BERL Uses the Labour Theory of Value

At page 35-36, BERL cites figures showing GDP per full time worker is 1.87 times wages per full time worker, and calculates forgone output lost from alcohol and drug consumption by multiplying forgone wages by 1.87. This assumption adds approximately $800 million to the total cost estimate.

BERL gives no indication it has considered the conditions in which this scaling might become appropriate. In scaling by 1.87, BERL is in effect allocating the surplus of all production to labour, leaving no surplus for capital. Students of economic history will recognize BERL's (presumably) inadvertent reference to the labour theory of value,[51] a theory discredited in part because of the restrictive and unrealistic conditions required for it to hold.[52]

A more realistic approach is to use a multiplier that reflects the findings of empirical studies of the relationship between value added per worker and wages. A multiplier in the order of 1.05-1.1 appears to represent a normal range for these estimates.[53]

5.1.4. Externalities Borne Only by Business and Government

At page 15, BERL reports:

> *Single et al (2003) makes a distinction between private costs and costs borne by others such as businesses or governments. The report argues a key distinction is that private costs are those that are knowingly borne by an individual while social costs are not freely borne by the user or are borne by others such as businesses or government.*

This indicates to us a fundamental misunderstanding of what externalities are. Externalities can be imposed on private citizens and, conversely, costs to a business of

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[50] We note an earlier death also reduces demand for those non-paid services. We might speculate that the early death of a harmful drinker deprives the country of more consumption of these non-paid services than production.

[51] See chapter 1 of Marx (1867), "Capital: Volume One."

[52] See section 4.2 for more details on this. BERL's multiplication makes sense only if labour in the counterfactual is fully employed, and labour and capital are perfect complements. Only under these highly unrealistic assumptions, and ignoring cohort effects, does a worker lost from the labour force reduce GDP by 1.87 times their wage.

[53] See, for example, Wolf (2004:176).

employing an unproductive worker are not externalities. Perhaps this misunderstanding contributed to BERL's decision to count private costs as social costs. A basic staple of principles-level economics is that costs or benefits are not external if the agents are linked through a contractual nexus: the baby crying next to me on the long-haul flight does not impose an externality on me because I have chosen to buy a ticket that includes the risk of such unpleasantness and was accordingly charged less for that ticket. Similarly, a worker who slacks off on the job or takes inordinate numbers of sick days does not impose externalities on his employer. It is worrying that BERL does not seem to recognize this basic definitional issue.

5.1.5. GDP is Not Usefully Compared With Costs

BERL repeatedly makes spurious comparisons between cost estimates and GDP. For example (at page 1):

> *Overall, harmful drug use in 2005/06 caused an estimated $6,881 million of social costs. This is equivalent to the GDP of New Zealand's agricultural industry ($6,701 million) or finance industry ($6,982 million).*

Martin Wolf (2004:221) calls this sort of mistake an "elementary howler". GDP is a value-added measure, but cost is not. From the comparison with GDP readers may draw the inference that $6.8 billion is the amount by which GDP is reduced due to harmful alcohol and drug use. It is not.

5.1.6. Alcohol and Drug Users Share General Population Characteristics

BERL assumes drug users have the same labour force characteristics as the general population (fn 36 p. 36). This assumption affects all of its net labour cost calculations, yet BERL offers no justification; correction for this reduces BERL's costs by $78 million.

5.2. Confounding Literature

In the time available, we have only been able to review a fraction of the available literature on the costs and benefits of alcohol consumption. However, we have been able to uncover literature that directly contradicts many of the claims underpinning BERL's cost estimates. In spite of their obvious relevance, none of the studies cited here are among BERL's literature references.

5.2.1. Drinkers Earn More

Stringham and Peters (2006) report drinkers earn 10-14 percent more than otherwise equivalent non-drinkers, and that men who go to bars earn an additional 7 percent for a total wage premium of 17 percent more than an otherwise equivalent non-drinker who stays home. Stringham and Peters suggest social drinkers have bigger social networks so they are likely to find better jobs or perform better on the job.

5.2.2. Drinkers Live Longer

In a widely referenced meta-analysis, Corrao et al (2000) look at 51 studies considering the relationship between the level of alcohol consumption and death rate. That study associated the lowest risk of death with men who consume two drinks (20 grams of alcohol) per day; women experienced maximal protective effects at one drink (10 grams

alcohol). Although benefits declined beyond those points, they remained positive (compared to no drinking) for a long range, with significantly harmful effects beginning only at five drinks per day (52 grams) for women and 11 drinks per day (114 grams) for men. This suggests a threshold for harmful usage somewhat above the "less than two pints for men" standard used by BERL.

5.2.3. Drinkers Enjoy a Multiplier Effect on Education and Experience

Stringham and Moore (2009) report on a recent analysis by Bray (2005) which found that drinking increased the benefits derived from both education and experience. While heavy drinking (six or more drinks on three or more occasions in the previous six months) somewhat reduced these positive returns, the benefit to moderate drinkers more than made up the difference. Bray concludes:

> *Based on these results, alcohol use does not appear to adversely affect returns to education or work experience and therefore has no negative effect on the efficiency of education or experience in forming human capital.*

Similar to Stringham and Peters (2006), Bray suggests the formation of human capital is aided by the social interaction associated with moderate alcohol consumption.

5.2.4. Alcoholism is a Symptom of Other Problems

Stringham and Moore (2009) also discuss a study by Vincent (2004), which examined 500,000 members of Kaiser Permanente health insurance in southern California. The study found that adverse childhood experiences including sexual abuse, missing parents, physical abuse, drug abusing parents and other incidents are highly correlated with alcohol abuse, tobacco use, drug abuse and obesity. Among members who never had an adverse childhood experience, defined above, only 3 percent of adults were alcoholics. However, adults with one adverse childhood experience had an alcoholism rate of 6%; 10% among adults with two adverse childhood experiences, and 16% among those with four or more. Stringham and Moore (2009) report the Kaiser study is consistent with many other early childhood development research findings.

To the extent that alcoholism is a symptom of other problems, BERL's assumed value of 50% avoidable costs may be optimistic.

5.2.5. Alcohol Saves More Lives Than It Costs

Collins and Lapsley (2008a:38) report alcohol, across all categories of consumption, saves more lives than it costs. Among low risk drinkers, Collins and Lapsley report an annual loss in Australia of 1505 lives, and 6,605 lives saved (compared with a counterfactual of complete abstinence). Across all drinking categories, Collins and Lapsley report a net saving of 2,300 lives per year.[54]

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[54] Collins and Lapsley (2008a:38) state that "[o]f the total lives saved as a result of alcohol consumption, 88 per cent occur at the age of 60 or above. 73 per cent of hospital bed days saved accrues to this age group." No explanation is offered. Note that we have not conducted an extensive review of the range of studies examining the extent of disease and injuries attributed to or prevented by alcohol; however, as BERL has zeroed out all possible positive health consequence of alcohol consumption, we feel confident in concluding that they have overestimated total health costs. As noted in Section 4.5, above, we have not

This is evidence against the introduction of population wide controls against alcohol use, such as tax increases, as argued for by Sir Geoffrey Palmer. Any gains in reductions of harmful drinking will be more than offset by losses among moderate drinkers if the price elasticity of demand is higher for moderate drinkers than for hazardous drinkers (which appears to be true – see Sloan, Reilly, and Schenzler 1994; Chaloupka and Wechsler 1996; Kenkel 1996, cited by Mast et al 1999). This warns strongly against the use of alcohol taxes to reduce net external costs of alcohol. Rather, measures should be targeted at the segments actually producing negative externalities. In particular, criminal activity is the largest generator of negative external effects. When we hear reports of individuals convicted five or more times for drink-driving offences compounded by driving on a suspended license, we wonder whether efforts might not be more targeted at that small but highly costly group. We do not raise the petrol tax to cut down on speeding; rather, we penalize speeding directly.

5.2.6. Conclusion

The empirical evidence presented here suggests alcohol consumption well beyond the 40 gram threshold used by BERL is associated with significant, measurable gross economic benefits. These are additional to other benefits derived from health and enjoyment.

5.3. Other Issues

Our review of the BERL report was hampered by poor citation. For example, we count 56 references to Collins and Lapsley (2008) in the BERL report, yet the report's References section lists two papers by Collins and Lapsley in 2008 and it is unclear which paper is being cited in each reference. References are generally listed without page numbers. A number of articles cited in the body text are missing from the report's References section. Data in tables are generally presented with no references to specific tables in reports, and a number simply list "BERL" and "StatsNZ" as their sources, making replication impossible. Compounding these difficulties is BERL's refusal to publicly release the working behind the numbers in their report. Our suggested adjustments to BERL's estimates must be considered in view of these difficulties.

BERL is frequently loose in its terminology. The term net social cost appears ten times in the report and BERL attaches more than one meaning to the term. On p. 10, net social cost is made distinct from gross social cost by noting that net means offsetting costs from early deaths are captured. Confusingly, however, on p. 39 net social cost is used to mean net of gross economic benefits, and at fn 15 on p. 10 "net harmful effects" means harms reduced by the presence of benefits. BERL uses the word 'drug' interchangeably to mean "alcohol and illicit drugs" and "illicit drugs only". Meaning can usually but not always be inferred from context.

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adjusted downwards BERL's health costs because we have not been capable of quantifying the net effects within the confines of this critique.

6. Concluding Remarks

What are the uses for a study using BERL's methodology?

The time, effort and expense of preparing their report, BERL (2009) has achieved remarkably little. Given the decision to count costs but not benefits, BERL reports the unsurprising findings that alcohol and drugs cost a great deal of money to produce and that use assumed to be harmful is costly, but the extent of those costs is not reliably estimated.

What, then, is the value of BERL's study? On its own, the report cannot be relied upon by policymakers if the basic goal of policy is to improve the national welfare. If the goal is to minimize harm, the BERL report might possibly be useful, notwithstanding the large overstatement of costs by BERL identified in this review. But as BERL acknowledges in its report (at p. 70), policy analysis requires an assessment of both costs and benefits; and harm minimization is easily recognized as inappropriate for policymakers by the untenable policy positions that objective would recommend. As a call to action, the BERL study fails – it cannot even indicate whether more or less regulation of alcohol and illicit drugs is desirable, because that requires an assessment of benefits as well as costs.

At most, policy makers will only derive meaningful direction from BERL (2009) if it can be paired with a corresponding study of benefits. Even then the BERL study would have only limited use: BERL's decision to confine its analysis to the harmful use of alcohol, thus excluding (by its measure) half of all alcohol consumed, means a corresponding study of benefits will only be able to inform policies capable of targeting 50% of the consumption that is assumed by BERL to be harmful. BERL has little to say about costs or benefits of population-wide policies.

Perhaps our most significant concern with the BERL report is its failure to warn readers about the methodology's limitations, in particular to explain that without an assessment of benefits their multi-billion dollar cost estimates contain no basis for policy formation. Far from warning readers, BERL rather contrives to leave the impression that their report has policy value by twice confusing costs with welfare estimates in the report's executive summary. Non-economists may be misled by these statements (and perhaps this is what led to incorrect citation of the costs reported by BERL in support of new regulations). In our view BERL has an ethical and professional responsibility to ensure that the report published in their name is not misused in such a manner.

A year-long study commissioned by the Ministry of Health and the ACC at a cost of over $135,000 must surely have some purpose. We leave it to readers to consider what that purpose might be.

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