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The financial costs and benefits of alcohol.

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## **Introduction**

Economic arguments are frequently used in discussion of alcohol policies. From the industry, claims are frequently made about the economic importance of the industry and the benefits it brings. It is suggested that any policies to control the problems of alcohol would have a major economic impact. Health and other policy advocates will in contrast highlight the harms caused by alcohol and the costs they impose on society. Policy makers are increasingly suggesting they would like to follow evidence-based policy-making and as such are looking for economic evidence such as the cost-effectiveness or value for money of different policy alternatives.

Attempting to make sense of the arguments is complicated by different studies with different definitions and a number of arguments about what consists of either a cost or benefit. The purpose of this paper is to give a brief review of the different types of costing studies and how these relate to different policy questions. Some guidance will be given as to how economic figures can be practically assembled to aid policy decision making but also some of the gaps in evidence that remain. Three types of costing studies are considered:

- Cost of illness;
- Externality types;
- Economic evaluation/cost effectiveness.

Variations in the types of costs and benefits included and some examples of the different studies are discussed.

## **Terminology**

Economics is a subject with its own language and as in many areas common words are often used to represent very specific economic meaning. Costing studies are no different and it is useful to begin by defining how specific words will be used in this paper. Alcohol is a substance used by many in every European country. The consumption of alcohol obviously brings some benefit to those individuals. The value of this consumption is referred to in this paper as the private benefits of consumption. Alcohol consumption is also associated with a range of costs to the consumer. There is the monetary amount that alcohol costs. Also where there are availability controls, consumers may incur additional financial and time costs in acquiring their alcohol. However, alcohol consumed in the wrong quantity or pattern or in the wrong situation, for example at work or while driving, is also associated with a range of costs that fall on the individual. This can include short and long-term effects on health, lower earnings through sickness absence or a range of alcohol related workplace effects, etc. These costs are in terms of both monetary amounts, e.g. lost earnings or non monetary effects such as the loss of health related quality of life. Economists frequently attempt to value these non monetary or sometimes called intangible impacts. Together all these impacts are defined as private costs. In a market economy it is usually assumed that consumers take all of the private benefits (monetary and non monetary) and all the private costs (monetary and non monetary) into account in making their decisions.

In contrast, some effects of consumption decisions may have impacts on others than the individual drinker. This is most clearly seen in the victims of alcohol related accidents, such as those killed or injured by drunk drivers. These third-party effects are called external costs by economists. However another type of external cost occurs when resources are used by the state to deal with alcohol related problems. For example, health care resources used to treat alcohol dependence could have been devoted to other illness. In systems where the individual does not pay (or pay fully) for their health care, these alcohol treatment costs are not borne by the alcohol misusers directly. Therefore alcohol misusers are imposing external costs on the non alcohol misusers. These are often referred to as institutional externalities and obviously they depend on the exact health and welfare systems of each individual country. Similar effects can occur in the workplace if employees do not lose wages in the event of a period of sickness or absence but the employer or other employees have to bear the cost of their loss of productivity.

Social costs are the sum of the private and external costs and likewise social benefits are the sum of the private and external benefits.

This discussion has excluded any impact of alcohol misuse on families. Some economists ignore costs and benefits within families across any behaviour, suggesting that households make decisions as a group. The only exception would be where criminal acts such as domestic abuse occurs. Historically many governments have also ignored such impacts other than providing some welfare support to families in poverty or crises as a result of alcohol misuse. However, the impact of alcohol misuse on families is considerable as an Eurocare report has documented (McNeill, 1998). Other economists would suggest that the impact on the family should be measured and included with other third party impacts. In practice these impacts have not been well documented and most cost studies have not attempted to put any monetary values on these impacts.

The terms financial and economic are also often used interchangeably. Many of estimates of the costs alcohol include the monetary value of factors such as the loss of life or the fear of crime or violence. These economic estimates are a means of imposing a common value system of a range of different, real effects. However, the sum denoting the loss of a life cannot be conventionally be realised in financial terms. In other studies the term financial is restricted to the impact on government or public finance. Some of the differences between studies, and which types of costs and benefits are included, are explored in the rest of the paper. For this paper, the focus is on economic costs, including both monetary and non-monetary impacts of alcohol.

### **Cost of Illness Studies**

A number of studies have produced estimates of the costs of alcohol for a particular country in a particular year. Frequently the estimated total figures are expressed as a percentage of Gross National Product. This gives a useful advocacy tool in demonstrating the size of the impact of alcohol. Most of these published studies have used the cost of illness approach. The question addressed in these studies is to estimate the costs of alcohol compared to the hypothetical situation that there was no alcohol consumption. However, the specifics of the question do vary from study to study. Some consider only the costs associated with alcohol misuse, while others

cover all alcohol use and attempt to factor in the potential benefits of lower alcohol consumption.

A set of international guidelines on conducting cost of illness studies for substance misuse is available and a second edition has been recently published (Single et al, 2003). However, despite these guidelines, most published studies have varied in both the methods use and the items included or excluded making international comparisons difficult. This is partly due to some inherent methodological and conceptual difficulties with the cost of illness approach but is also due to differences in data availability and completeness of the estimates in different countries.

There are some common contents of these studies including normally:

- Health care costs;
- Loss of life;
- Productivity costs associated with sickness absences and excess unemployment;
- Alcohol related crime costs;
- Accidents, including road traffic accidents;
- Loss of life;
- Policy and research costs.

The costs are generally external costs of alcohol misuse although whether loss of life is a private or external costs is discussed below. Also some studies confine estimates to tangible elements such as public sector resource costs and ignore intangible elements such as the fear of crime although practice does vary. The estimates are usually based on the current prevalence of problems in the year in question, again with the exception of the treatment of the loss of life.

A number of studies have been conducted across the world and some examples are given in Table 1. The increase in cost across countries and time is partly due to inflation but another important factor is the wider range of alcohol related problems for which data are available. Clearly there are also some changes in the drinking patterns across time but existing studies have not used consistent enough data and methods to be able to track the impact of such changes.

**Table 1: Examples of alcohol cost of illness studies**

Study	Country	Year	Costs (€ billions)
Collins and Lapsley, 1991	Australia	1988	1.19
Collins and Lapsley, 1996	Australia	1992	1.52
Collins and Lapsley, 2002	Australia	1998	3.28
Rice et al., 1990	U.S.	1995	72.4
Harwood et al., 1997	U.S.	1992	141.0
ONDCP, 2001	U.S.	1998	127.8
Maynard, 1992	England& Wales	1985	3.73
Rannia, 2003	England	2000	20.0
Fenoglio et al., 2003	France	1997	17.6

Source: Rannia, 2003; Fenoglio et al., 2003.

It is important to note that the figures are based on the estimate of actual costs in a given year relate to any past or present alcohol use. Not all these costs are avoidable. Therefore while the figure may give an estimate of the importance of the problem and how it relates to estimates of other problems, it gives no guide to how and whether such costs can be reduced or the potential “savings” to be made.

One of the biggest contrasts in the size of the estimates is for England and Wales. Here the estimates have seemingly increased ten fold over 15 years. However, the differences related largely to the types of drinkers included. Maynard’s (1992) estimate was based on very heavy drinkers only whereas Rannia’s (2003) study contained a much wider range of drinking effects, especially for crime. Interestingly a similar study in Scotland (Scottish Executive, 2001) had resulted in a similar level of costs per head as the new English study.

A more detailed breakdown of the Rannia (2003) study for England is given in Table 2. This study did include some policy costs associated with dealing with alcohol related problems such as treatment costs (£96.2 million, €143 million), and criminal justice costs for drink-driving (£77.3 million €115 million), alcohol specific (£29.9 million, €44.5 million) and alcohol related offences (£1720 million, €2563 million). However, the costs of preventive programmes (there are no current national campaigns) or research expenditure were not included in the figures.

**Table 2: Cost of alcohol misuse in England, 2000.**

<b>Type of cost</b>	<b>Cost, £ billion</b>	<b>% of total</b>	<b>€ billion</b>
Health care	1.7	<b>8.5</b>	<b>2.5</b>
Workplace	3.9	19.5	5.8
Lost output to premature death	2.5	12.5	3.7
Crime	11.9	59.5	17.7
<b>Total</b>	<b>20.0</b>	<b>100</b>	<b>30</b>

Source: Rannia (2003)

All studies have some estimate of the health care costs of alcohol related illnesses. The estimates are based on international reviews of the relative risks of alcohol consumption on a range of diseases. These relative risks combined with information about the drinking patterns in a specific country in a specific year. Combining relative risk information with consumption patterns yields estimates of the attributable risks or proportion of each disease category that can be attributed to alcohol. These proportions can then be applied to disease based costs of health services. However, not all countries will have health care accounts by classification of diseases. Even where figures are available some health services such as primary care and emergency care may be excluded and therefore alcohol related costs may often be underestimated. Another potential source of underestimation is that costs for those with alcohol related problems are often higher than those with the same disease problem without alcohol involvement. Harwood et al (1997) in one US study did attempt to adjust figures for this impact. Health care costs typically make up between 5% to 20% of the total estimates.

The impact of alcohol on the workplace is also generally included but the data available for such estimates varies widely. Rather than evidence being available from international systematic reviews, specific country studies are used to provide some guidance to the costs involved. There are a variety of different costs that can be included in the section (Godfrey et al, 1997). Most studies include some estimate of the productivity costs of alcohol related illness, particularly longer-term illness related to alcohol dependency. Depending on the country and the particularly workplace these costs may fall all or partly on the employer or be borne in part by the state or the individual drinker. More difficult to measure but likely to be of sizeable impact are the short-term absences, especially those associated with binge drinking. Another area of more controversy is the impact of drinking on the productivity of those at work. This aspect has been frequently considered by considering earnings differentials across different drinking patterns. However, higher earnings are also a factor influencing drinking patterns and it becomes statistically difficult to differentiate these factors. Another issue is whether earnings can be taken to reflect individual productivity rather some group productivity particularly in European workplaces. It is clear that in many work situations the poor performance of those with alcohol problems whether short term or longer-term are a cost on fellow workers and their employers but this may not necessarily be reflected initially in their earnings. Very heavy and chronic drinking is associated with excess unemployment. While this impact has been included in many of the costing studies there is some question about how such productive loss should be valued in economies where there is not a shortage of labour. Finally there are other impacts of alcohol in the workplace, which may be of particular significance to employers, including legal liability for health and safety and return on training and investment in key workers. These aspects will be considered further in workshops at this meeting.

Crime costs vary considerably between studies. In Rannia's (2003) study for England crime costs account for a much higher proportion of the total at nearly 60% compared to, for example, the most recent Australian study where crime only accounted for 16% of the total (Collins and Lapsley, 2002). Differences are hard to pinpoint but the English study included the same detailed attributable risk calculations across all types of crime as described above for health care costs. Also the costs of crime included not only the criminal justice costs but also costs involved in prevention of such crimes and the property, production and victim costs associated with the crimes. These victim costs for the alcohol related crimes accounted for 68% of the total crime costs.

A major component of all cost of illness studies is the value given to premature mortality related to alcohol use. The figures of premature deaths are calculated using the same sorts of epidemiological reviews of relative risks for different diseases employed for estimating health service costs. Most studies use calculate deaths in the year of the study and value these deaths by an estimate of their lost future earnings. There are several important issues with the inclusion of such deaths and the method used to calculate the value of these deaths occurring. First, unlike other items the costs are calculated for projected loss over future years. Second, deaths and their value could be considered as a private costs rather than an external cost to society.

This argument relates to the valuation method used, which is the value of the loss of life in terms of productivity loss not intrinsic worth. The human capital method of valuing loss of life through calculating future lost earnings has been largely

abandoned in other areas of economic evaluation. There are serious ethical concerns at giving lower values to the lives of the unwaged, women, the retired and the disabled. Some studies have extended the methodology to suggest that these groups do have some “productive” worth through caring etc and given a value for these deaths. Using more conventional values for the loss of life would yield much higher values. For example, Rannia (2003) had an average value of £147,187 per alcohol related death. These deaths include 500 related to road traffic accidents where a significant number could be of “innocent” victims – a true external cost of alcohol use. If these deaths had been valued by the willingness to pay methodology, the Government’s own estimate of this value was £1,144,890 (Department for Transport, 2000). Replacing this valuation for the one used in the study would raise the total figure from £20 billion to £43 billion.

The inclusion of a value for loss of life also illustrates clearly the economic rather than financial element of cost of illness studies. Saving lives from reducing alcohol misuse is of important social value but it does not bring financial savings to governments’ or employers’ budgets. Confusingly these estimates are often grouped with costs occurring in the workplace. Not surprisingly in most studies the value put on premature deaths is one of the largest items of the calculated costs.

Finally some studies include the policy expenditure on preventing alcohol misuse and research into alcohol misuse as well as the harmful consequences. This means in theory the estimate of social costs could be seen to rise, at least in the short term, if governments enact a comprehensive alcohol strategy.

What can be concluded from cost of illness studies and how difficult is it to undertake these studies? It is clear from this brief review that one of the ways studies differ is in the data available to enumerate alcohol related problems. Estimates of alcohol related costs have generally risen in countries, which have performed more than one study as more data on the risks associated with alcohol become available. Potentially this is one of the values of undertaking these studies as it does reveal the range and extent of alcohol related health, workplace and crime related costs. The studies can be resource intensive if new international reviews of the evidence are required. However, there is increasingly international risk estimates becoming available, which bring these calculations within the reach of many countries with reasonable sources of routine data. These figures and calculations are a useful resource which can be employed in many other more specific studies and policy evaluations.

### **Externality Studies**

The second type of study has a different question and framework but much of the data collected for cost of illness studies with some adjustment can be used. While some have used the externality approach empirically in the tobacco field, for alcohol the studies have been of more theoretical interest opening up the debate about what should or should not count as a cost and benefit of alcohol use.

The basic question being addressed is, unlike the cost of illness studies, directly policy relevant. Are the current policies directed against alcohol misuse sufficient such that there are no “external” costs compared to all or part of the revenue from alcohol consumption? If there was evidence of an excess, this would be a signal to

governments that there was potential to improve social welfare by policies directed at reducing misuse. However, such policies would only be worth pursuing if the benefits (in terms of reducing the “external” costs) outweigh the resources needed to enact the policy. This additional question about the value for money of individual policies is the third type of costing study being considered in this paper. The savings and costs being considered in this type of study are in terms of resources not just financial flows. For example, nuisance from alcohol related violence clearly impacts on non drinkers and could be part of these types of study. Reduction in such nuisance would improve social welfare but such improvements would not conventionally appear in national accounts and Gross Domestic Product (GDP).

The economic framework for these studies rests on market theory. This involves assuming the consumer is fully informed about the risks of consumption and is rational, that is the consumer is capable of making consumption decisions in their own best interests. Under these assumptions, only external costs would be considered. Any individual impact including possibly loss of life would be ignored as a private cost, the risk of death being part of the consumption decision. Also any policy that led to an involuntary change in alcohol consumption could be seen to have some costs in terms of individuals losing the benefits of consumption. However, economists have argued that neither information or rationality assumptions may fully hold in alcohol markets (see Buck et al, 1997 for a summary of these arguments and Table 3).

**Table 3: External cost models – which costs count under different assumptions.**

			Addicted (not rational)	Not addicted
Unaware of	adverse		Private + external costs +	Private and external costs
consequences			production resources	
Aware of	adverse		External costs + ?	External costs
consequences				

In the situation that consumers are not fully aware of the risks of consumption, they will not take all the private costs into account in their decisions. In considering whether governments are currently maximising social welfare it is therefore necessary to include some of the internal costs in the externality model. However, consumer attitudes to risk and information are complex. For smoking risks are often known and sometimes overestimated but smokers still can be rational in demanding government interventions such as increased taxes (see Gruber 2003). For alcohol young people may overestimate risks from life threatening diseases such as liver cirrhosis (Lundberg, 2003) but be unaware of many of the more immediate risks from accidents and binge drinking.

Dealing with the young drinker and dependent drinker raises the question of rationality. If people cannot make choices in their own best interests then there is an argument that social welfare may be higher if resources devoted to alcohol production were switched to other goods or services. Taking a part of the alcohol consumption expenditure into account in cost models (see Collins and Lapsley, 1991) could significantly increase the excess costs of alcohol. However, others would argue that

even with dependence, consumers do make choices as evidenced by changes in behaviour prompted by economic incentives such as price changes.

Finally, Markandya and Pearce (1989) argue for tobacco that not all revenue yields should be used to compare to any excess costs of a lifestyle factor. They argue that the purpose of the tax is not to “correct” market distortions because of the adverse effects of consumption but to raise revenue. They suggest only a proportion of the revenue should be used in addressing the question are governments doing enough.

These arguments can seem complex but underlie very important issues in addressing alcohol policy. Free market economics is the background to many international trade agreements and much of the EU policy. The externality model and its extensions follow the logic of these market theories and suggest a framework for improving economic and social welfare from many of the policies the alcohol industry are arguing against. Again using such economic models also gives an argument against the consideration of loss of jobs or revenue associated with one form of consumption. The models suggest that as people change habits new jobs and revenue would be created from their new spending patterns replacing any loss from reduced alcohol use.

In practical terms empirical testing of the models could be conducted using some of the same data as is compiled for cost of illness studies. Indeed in the Australian (Collins and Lapsley, 2002) and French (Fenoglio et al. 2003) costs studies some attempt is made to look at just the external costs and compare this to revenue yields. For the UK, the external costs are likely to be in excess of the £20 billion figure and indeed taking loss of life into account and using more usual figures to value this loss could bring the total to closer to £45 –50 billion for the UK as a whole. This is clearly way in excess of the revenue yield of £12 billion in 2000/01.

### **Economic evaluations**

As more evidence becomes available it is likely that in many countries studies could be conducted which suggests governments should be more active in reducing alcohol consumption and problems. However, these governments will also need to be persuaded about the evidence of effectiveness of different policies and their cost effectiveness or value for money. Economic evaluation techniques have been most developed and used in health care planning. Indeed in many countries there are explicit regulatory frameworks that govern the introduction of new medical technologies. In the UK, the National Institute for Clinical Excellence uses an economic framework to assess the additional costs and effectiveness of the technology under evaluation in comparison to current practice. Technologies yielding health gains of a quality of life year for £30,000 (€45,000) or less are generally recommended for adoption.

The question is whether different alcohol policies would fall below this benchmark.

Economic evaluation studies compare the costs and consequences (good and bad) of two or more alternative interventions. Costs include the actual cost of the intervention to the service provider but can also include the costs that are borne by other agencies or indeed the time and financial costs that fall on the individual and families. As mentioned above this may for coercive policies include the lost benefits of foregone

consumption. The benefits or consequences of the interventions include both private and external impacts. For health interventions the gains are often measures in deaths averted, life years gained or quality adjusted life years gained but could be expressed in more alcohol specific measures.

It is outside the scope of this paper to provide a full review of available studies (see Ludbrook et al., 2001). Many of the other speakers at the conferences and in the workshops will be presenting data from a range of data on both effectiveness and some costs. There is also an increasing literature on the cost effectiveness of different alcohol policies. The WHO CHOICE project is also producing some more global estimates in terms of costs per DALYs on a range of alcohol strategies. There is also good bibliographies of published economic evaluation studies available through the NIAAA website. There are also more explicit guidelines on conducting studies of costing interventions and evaluating cost effectiveness available from the EMCDDA.

As economic and cost data are local to areas there are some more difficulties in translating evidence across countries and time periods. Most economic evidence relates to treatment and the evidence here is impressive. Effective brief and more intensive interventions compared to a no treatment, generally not only fall beneath cost effectiveness thresholds, but yield positive savings in resources even when the health benefits to the individual drinker have been excluded. Similar evidence in the illicit drug field in the UK led to a major increase in public expenditure for drug treatment but a similar policy initiative has not as yet been put in place for alcohol.

**Table 4 Simulated cost-effectiveness of alcohol treatments using local cost data, models of longer term health consequences and reviews of evidence.**

<b>Treatment type</b>	<b>Net health care cost per death averted, £2002</b>
Coping/social skills	-3073
Behavioural self control training	-1278
MET	-2089
Marital/family	-2388
Acamprosate	-1122
Naltrexone	2076
Unsupervised disulfiram	5536

Source: Slattery et al, 2003

What can be done to increase this evidence and its strength? Obviously there are major research gaps. Some of these are in the basic epidemiological data linking drinking patterns to different risks. However there is also a lack of empirical economic evaluations. Increasing numbers of studies are including economic evaluation alongside rigorous evaluations of effectiveness. The UKATT trial in the UK is an example of a large randomised trial of 720 heavy drinkers and a large amount economic and drinking outcome data has been collected as is now being analysed. Such projects are however expensive. Another alternative is to build economic evaluation on retrospectively to other studies as was achieved with Project Match (Holder et al, 2000). Even with more studies reporting cost effectiveness results however local decision makers need to model the data using local cost figures

and adapt studies to their own population. A lot can be done with existing data and in a recent study for the Scottish Executive (Slattery et al, 2003) models of different treatment were compiled at a reasonable research cost, see Table 4. This study used systematic reviews of treatment effectiveness with a model of the costs of treatment and the long term health consequences averted. Finally as more data on the pattern of social costs across a broader range of drinking patterns emerges it will be possible to conduct broader and order of magnitude modelling across a wider range of policies. Programme budgeting techniques provide a method of combining available evidence and simple modelling of the available economic data to guide decision choices.

## **Conclusions**

Studies showing a large monetary sum associated with alcohol misuse have the power to attract attention and foster debate about appropriate government responses. These figures have generally been constructed using the cost of illness methodology. The figures generally have been in the range of 1 to 5 per cent of GDP. This methodology can require considerable work in constructing country specific data on alcohol consumption and drinking problems. While these studies have improved in standards and expanded in scope, there are still many differences between published studies.

Externality studies have not been generally used to examine the question of the scale of government action to reduce alcohol problems – is enough being done? The benefit of this technique is that it provides a framework for discussion of the economic arguments supporting government action in market economies. Such models and other economic analysis of health behaviour suggest that consumers can rationally choose policies that restrict their choices for the sake of their own and others well-being.

Finally there is accumulating evidence about the cost effectiveness and cost ineffectiveness of different alcohol interventions. A number of empirical studies of face-to-face interventions indicate that implementing these interventions will bring net savings. However, this does not necessarily mean that the “savings” are financial or can be realised in the short term. The most cost effective interventions may not be the cheapest to implement. Also many of those interventions favoured by both governments and industry such as school interventions may be both costly and ineffective. There also remains an issue of persuading governments to invest now to yield both the economic savings and the increases in the health of their populations.

While there are large gaps in our information about the costs of alcohol policies and their economic consequences, studies can be undertaken to help guide policy decisions with the best data available. These data are likely to provide a much stronger evidence base than claims made by industry about potential economic impacts on their own industry. Alcohol policy advocates do need to fully understand the financial costs and benefits of alcohol so that they can, with some help from economist friends, produce local relevant and persuasive figures of the financial costs of alcohol misuse and the financial benefits of alcohol interventions.

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