



M a k i n g B u s i n e s s S e n s e

The impacts of a minimum unit price for alcohol in England

A critique of the Home Office Impact Assessment of the Government's proposed 45p MUP for alcohol

Report for SABMiller

December 2012



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1 Summary of Home Office findings

The Home Office (HO) Impact Assessment (IA) describes the objective of the minimum unit pricing (MUP) policy being considered, that is, “to reduce the consumption of alcohol by harmful and hazardous consumers in particular, whilst minimising the impact on responsible consumers.” This is to be achieved by increasing the price of alcohol that is currently sold at very low or heavily discounted prices. The predicted fall in overall alcohol consumption as a result of the 45p MUP examined is 3.3%.

The intended effect is “to reduce the harms associated with excessive consumption such as the number and associated costs of alcohol related crimes; alcohol related health problems, and deaths due to alcohol.”

The Impact Assessment constitutes an attempt to weigh the envisaged benefits from the policy against the expected costs associated with its introduction. HO concludes that a 45p MUP will, over a 10-year period, deliver net benefits to the value of £352 million. This is the net present value of the discounted flows of benefits and costs over the 10-year timeframe, with a discount rate of 3.5%. Summary details of the benefits and costs leading to this positive net impact are shown in Table 1.

Table 1: Home Office ‘best estimates’ of costs and benefits

	Average annual (£m)	Total (PV) (£m)
Costs	200	1,740
Benefits	233	2,090

Source: Home Office IA

Further detail is also provided on the description and scale of the key monetised costs and benefits as they are broken down by ‘main affected groups’. This is summarised in Table 2 below.

Table 2: Key monetised benefits and ‘main affected groups’

COSTS			BENEFITS		
Items monetised	Main affected group	Monetised cost (£m p.a.)	Items monetised	Main affected group	Monetised cost (£m p.a.)
Transition	Retailers	9.6	Health	Health bodies	220.0
Enforcement	Public sector	0.5	Crime	Victims, police, criminal justice	12.9
Excise duties	Exchequer	200.0			

Source: Home Office IA

The appraisal of costs and benefits is based on the outputs of the Sheffield University alcohol policy model (the 'Sheffield model').¹ As version 3 is currently under development, version 2 (which relies on 2008 baseline data) was used by the Home Office. The 45p MUP was, however, downwardly adjusted (using RPI 2008-2011 and HMT forecasts 2012-2014) to ensure consistency between the level of the MUP and the price data it is applied to (noting that the proposed year of implementation of the policy is 2014). Baseline consumption of individual drink types was also updated to reflect 2011 patterns (using Nielsen & CGA sales data).

Despite these rather minor adjustments, the principal flaw of the Home Office IA is precisely this reliance on the Sheffield model. Cebr produced a report in 2009 (*Minimum Alcohol Pricing: A Targeted Measure?*) in which we reviewed the report on the Sheffield study that led to the development of the model.² We pointed out at the time that the model overestimates the potential impact of price changes on consumption levels of hazardous and harmful drinkers.

The next section provides a critical analysis, from this perspective, of the conclusions on which the Home Office quantifications are based, drawing on our previous criticisms of the same Sheffield model used to make those quantifications. The subsequent section addresses other potential shortcomings of the IA. However, none are as fundamental as the use of the flawed Sheffield model and the fact that this will inevitably result in an overstatement of the benefits of the policy and an understatement of the unintended negative consequences, specifically the impact on moderate responsible drinkers.

¹ The SchARR (University of Sheffield School of Health and Related Research) model was developed to assess the impact of alcohol pricing policies on alcohol consumption and health, crime and employment outcomes.

² Meier et al (2008), 'Independent Review of the Effects of Alcohol Pricing and Promotion, Part B, University of Sheffield.

2 Reliance on a flawed University of Sheffield alcohol policy model

2.1 Key points from the Impact Assessment

The foundation of the entire Impact Assessment is the Sheffield model's predictions about the impact of a 45p MUP on alcohol consumption. The model predicts an overall 3.3% reduction in alcohol consumption across the entire England population. Furthermore, it predicts the following:

- A 5.9% reduction in harmful drinkers' consumption;
- A 2.2% reduction in hazardous drinkers' consumption; and
- A 1.2% reduction for moderate drinkers.

Page 6 of the IA states that:

"There is evidence to suggest that pricing policies have a similar or stronger effect for the identified at-risk groups (under 18s, young adult binge drinkers and harmful drinkers) and may thus be especially suitable for reducing overall harms in these groups",

and that:

"Price elasticities used in the Sheffield University model are consistent with the international evidence base on alcohol and price interventions. Based on these, the Sheffield model findings are that the heaviest consumers reduce their consumption most in response to a MUP focused on raising the price of the cheapest drinks."

The section 'consumption effects' on pages 9-10 then appears to conclude that:

"There is clear evidence to suggest that MUP will reduce consumption of harmful and hazardous consumers. It is important to note that MUP has not yet been implemented in any other country and so consumer response is uncertain. The closest comparable policy is social reference pricing in Canada with initial analysis suggesting that consumption has reduced."

2.2 The evidence on elasticities

Everything in the Home Office IA hinges on the alcohol demand elasticities that drive the changes in consumption in response to the price changes that result from the introduction of a 45p MUP. For that reason, this subsection focuses on Cebr's view, already articulated in previous reports, of the evidence base on elasticities.

Aggregate elasticities

There exists a substantial volume of research on the impact of price changes on alcohol consumption levels. Perhaps the most important studies in this area are the two *meta-analyses* by Gallet³ (2007) and Wagenaar et al⁴ (2008), as well as the original University of Sheffield study.⁵ According to

³ Gallet, C. A. (2007), The Demand for Alcohol: A Meta-analysis of Elasticities, Australian Journal of Agricultural and Resource Economics, 51, 2, 121-135

⁴ Wagenaar, A. Salois, MJ, Komro, KA (2008). Effects of Beverage Alcohol Taxes and Prices on Consumption - A Systematic Review and Meta-analysis of 1003 Estimates from 112 Studies.

Sheffield University's systematic review of evidence on this subject⁶, both meta-analyses mentioned above are of good quality. The Gallet (2007) study covered a meta-analysis of 132 separate international studies that report alcohol elasticities, and was described as being "certainly superior to any such analysis possible within the time and resource constraints of these reviews." The Wagenaar et al (2008) study covered a meta-analysis of 91 individual studies, and was described as being "highly comprehensive" in the Sheffield review.

Both of these meta-analysis studies computed aggregate elasticities for all alcohol products, as well as individual own-price elasticities for certain product categories. The Wagenaar et al study, in addition, computed aggregate elasticities for different types of drinker. The original University of Sheffield study also calculated aggregate elasticities for different types of drinker, along with own-price elasticities for different product groups and types of drinker.

The table below summarises the aggregate elasticities calculated by these studies.

Table 3: Aggregate alcohol elasticities

Study	Territory	Mean / median elasticity	Elasticity for moderate drinkers	Elasticity for heavy drinkers
Wagenaar et al	International	-0.51	-0.62*	-0.28
Gallet	International	-0.54		
Sheffield	UK	-0.40*	-0.47	-0.21

* Implied elasticities

Source: Sheffield University

Cebr remains of the view that there are two key conclusions that can be drawn from these aggregate alcohol elasticities:

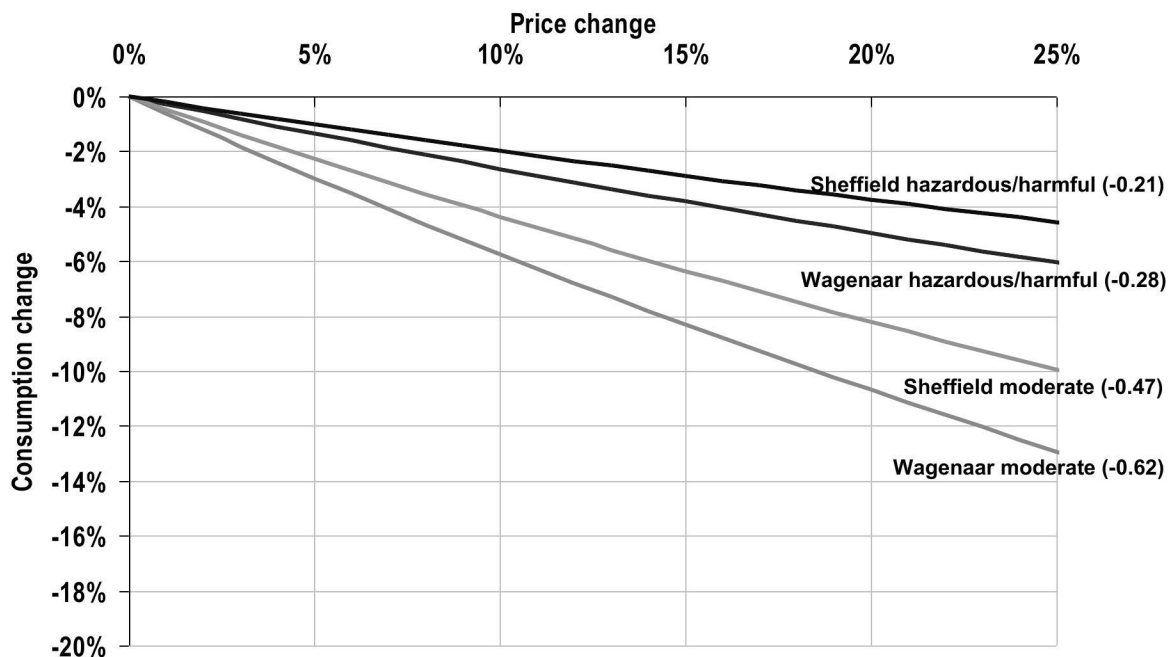
- Demand for alcohol products is **relatively inelastic** to price changes. The three studies highlighted above find an average elasticity of between -0.40 and -0.54, which implies that a 10 per cent price increase across all alcohol products would lead to between a 4.0 and 5.4 per cent reduction in consumption of alcohol products.
- **Heavier drinkers are generally less responsive to price changes** than moderate drinkers, in terms of their overall consumption. The elasticity of -0.21 found in the Sheffield study implies that a 10 per cent general price increase across all alcohol products would only lead to a 2.1 per cent reduction in alcohol consumption amongst heavy drinkers.

These results are further illustrated in Figure 1 below.

⁵ Meier et al (2008), 'Independent Review of the Effects of Alcohol Pricing and Promotion, Part B, University of Sheffield.

⁶ Meier et al, 'Independent Review of the Effects of Alcohol Pricing and Promotion, Part A: Systematic Reviews, University of Sheffield, 2008

Figure 1: Implied relationship between price changes and consumption changes



Source: Sheffield University, Cebr analysis

Other academic evidence supports these findings. For instance, Manning et al⁷ (1995) found that moderate drinkers are generally the most price elastic, and that the 95th percentile of drinkers has elasticity not significantly different from zero.

However, as well as being supported by the evidence, these findings have intuitive appeal. One would expect that amongst heavier drinkers there would be a proportion of people that have some level of dependency upon alcohol, which would increase with the amount of alcohol consumed. In addition, amongst heavier drinkers there will be a greater degree of social drinking. Intuitively, both dependence and social ritual are likely to mean a greater degree of resistance to price changes.

Own-price elasticity evidence

The other important evidence to consider is that on the own-price elasticity of demand for specific alcohol products. The original Sheffield University study presents some interesting evidence in relation to own-price elasticities by different types of drinker. It finds that, on the whole, own price elasticities are higher for heavier drinkers than they are for moderate drinkers. The following table shows the typical range of own-price elasticities for different types of drinker found by Sheffield.

⁷ Manning, W.G., Blumberg, L., & Moulton, L.H. (1995). The demand for alcohol – the differential response to price. *Journal of Health Economics*, 14(2), 123-148.

Table 4: Typical range of own-price elasticities by category of drinker

Category of drinker	Low	High
Moderate	-0.29	-0.52
Hazardous	-0.30	-0.61
Harmful	-0.41	-0.70

Source: Sheffield University

One of the key reasons that own-price elasticities increase with levels of alcohol consumption is that heavier drinkers are more prepared to switch between different types of alcohol product when faced with a price change than are moderate drinkers. This is explained in the following way in the original University of Sheffield (Phase B) report:

*“Some evidence exists in the literature to suggest that heavier drinkers are **less** responsive to price changes than lighter drinkers...by contrast, our own [evidence] shows, in general, own-price elasticity magnitudes increasing with mean quantity of alcohol consumed. However, the relationship we observe between overall price elasticity and level of drinking is **more complex due to [substitution effects], with hazardous [and harmful] drinkers showing the greatest level of substitution behaviour**, which in some cases is an order of magnitude greater than that estimated for moderate drinkers.*

*“To enable more direct comparability with the estimates in the literature we have also generated elasticity estimates for total alcohol purchasing...These are in broad agreement with the literature, showing that – at the highest level of aggregation – **hazardous and harmful drinkers** (combined elasticity of -0.21) **are less price elastic than moderate drinkers** (combined elasticity of -0.47).”*

– University of Sheffield Phase B report, page 51

In other words, heavier drinkers are more likely to switch consumption from beer to spirits if the price of beer goes up and the price of other alcohol products remains constant, than are moderate drinkers. However this does not mean that heavier drinkers are more responsive to price changes in terms of their overall alcohol consumption, and the aggregate elasticities presented here and earlier suggest that the opposite is the case.

At the time, we pointed out that, unfortunately, this evidence appeared to have been misinterpreted by proponents of minimum pricing, including the Chief Medical Officer for England.

“There is a clear relationship between price and consumption of alcohol. As price increases consumption decreases, although not equally across all drinkers. Price increases generally reduce heavy drinkers’ consumption by a greater proportion than they reduce moderate drinkers’ consumption.”

– Chief Medical Officer Annual Report 2008, chapter on ‘Passive Drinking’, page 22

Such misinterpretation of the evidence favours the case for minimum alcohol pricing as it suggests that heavier drinkers would react more strongly to price changes than moderate drinkers, in terms of their overall consumption levels. In fact, the evidence seems to suggest that heavier drinkers are more likely to switch from one product category to another in the face of price changes, but that their overall consumption levels are less responsive to price changes than those of moderate

drinkers.

2.3 The price-consumption relationships in the Sheffield model

The original Sheffield report described how the model estimates price and income elasticities of demand for sixteen alcohol product categories. The resultant matrices of 'own price' and 'cross price' elasticities show significant differences between different alcohol types and types of drinker. Cebr found it difficult to comment on the plausibility of specific elasticities within these matrices, but we noted the following overall issues:

- 'Own price' elasticities for different types of drink tended to increase with the amount of alcohol consumed. Therefore, moderate drinkers have the lowest elasticities to price and harmful drinkers have the highest elasticities. This is consistent with a situation in which heavier drinkers have a greater tendency to switch between products given a price change in one particular product.
- The report also stated that the Sheffield team had calculated high-level price elasticities across all alcohol products. These showed a much lower responsiveness to price for hazardous and harmful drinkers than they do for moderate drinkers. However as the original Sheffield report states: "these are for reference only and are not included in the model". But it was and remains Cebr's view that this is a significant oversight on the part of the Sheffield team – at the very least this finding should have been used as a 'sense check' to the results of the model and, in reality, the overall responsiveness of alcohol consumption to price is a valid input to be included within the model, given the potentially large inaccuracies involved in modelling the responsiveness of individual alcohol products to price changes.
- The latter finding was not reported in the executive summary of the original University of Sheffield report, whilst the finding that own-price elasticities are higher for heavier drinkers was. We suggested that this would leave readers with the impression that heavier drinkers are more responsive to price changes than moderate drinkers, when the evidence actually suggests that they are less responsive at an aggregate level.

The Sheffield model forecasts the impact of MUP policies on the alcohol consumption levels of the various groups covered by the study – moderate, hazardous and harmful drinkers, along with specific target age groups. However, it was apparent from Cebr's review that the **price-consumption model produces results that are inconsistent with the wider evidence base**. Specifically, the model consistently produces results that suggest that hazardous and harmful drinkers are more responsive to changes in the price of alcohol than moderate drinkers – not only in terms of switching between alcohol products but also at an aggregate level.

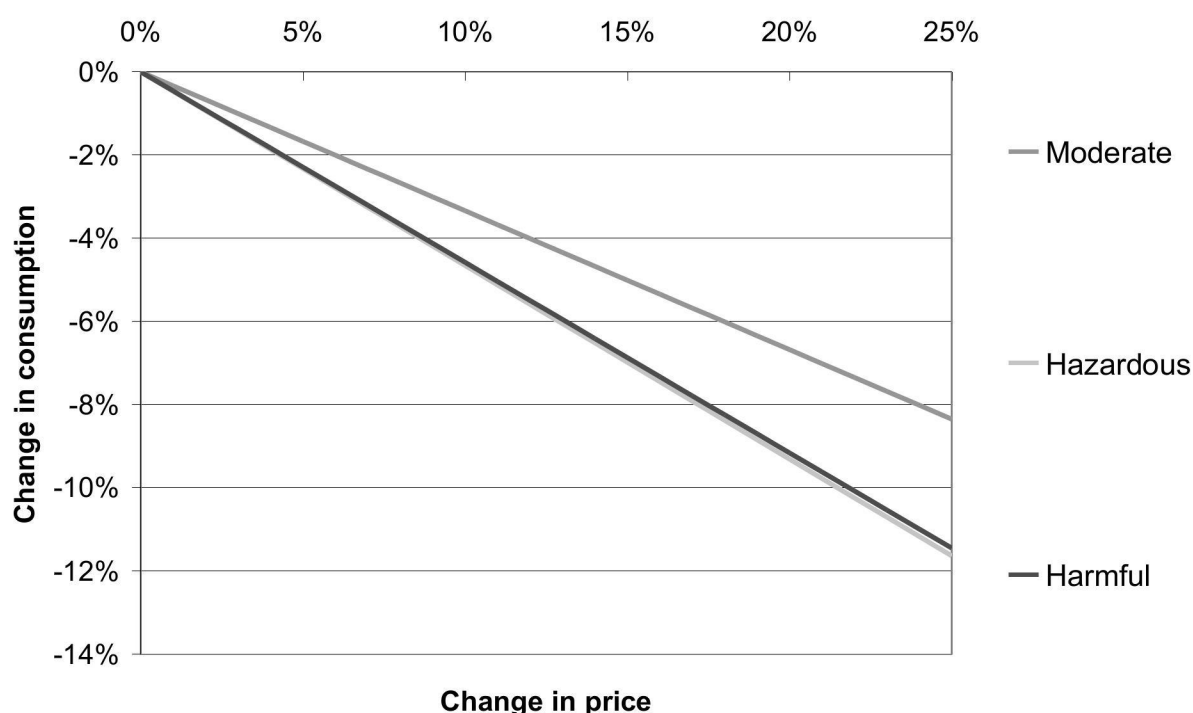
General price increases

This was most apparent when we considered the results of the modelling of 'general price increases'. Here, there should not have been any significant impacts from switching between alcohol products, as the assumption was that all types of alcoholic beverage would go up in price by roughly the same percentage. Given this, we would have expected hazardous and harmful drinkers to exhibit smaller relative changes in alcohol consumption than moderate drinkers, for a given price change, based upon the evidence presented above. Figure 2 shows the implied relationship (estimated by

Cebr) between price and consumption based upon the Sheffield results.⁸

This clearly illustrates that the Sheffield modelling shows a greater responsiveness to overall price changes amongst heavier drinkers, a direct contradiction to the evidence (presented here and in the Sheffield report), which shows that hazardous and harmful drinkers are least responsive to price changes overall.

Figure 2: Implied relationship between price changes and consumption levels from Sheffield modelling, based upon modelling of 'general price increases' ⁹



In addition, the modelling seems to imply a smaller than expected response to price for moderate drinkers. The implied price elasticities are shown in the table below.

Table 5: Implied elasticities from Sheffield Modelling

Type of drinker	Implied elasticity	Expected elasticity
Moderate	-0.33	-0.47 to -0.62
Hazardous	-0.47	-0.21 to -0.28
Harmful	-0.46	-0.21 to -0.28

⁸ It should be noted that for each category of drinker, this graph is based upon three observations – a 1 per cent, 10 per cent and 25 per cent general price increase. But, for each category of drinker, the results show an exactly linear relationship between average price changes and consumption. We remain confident, therefore, that the relationships we have implied above are an accurate representation of the Sheffield model.

⁹ Based upon results in tables 39, 40 and 41 of University of Sheffield Phase B report

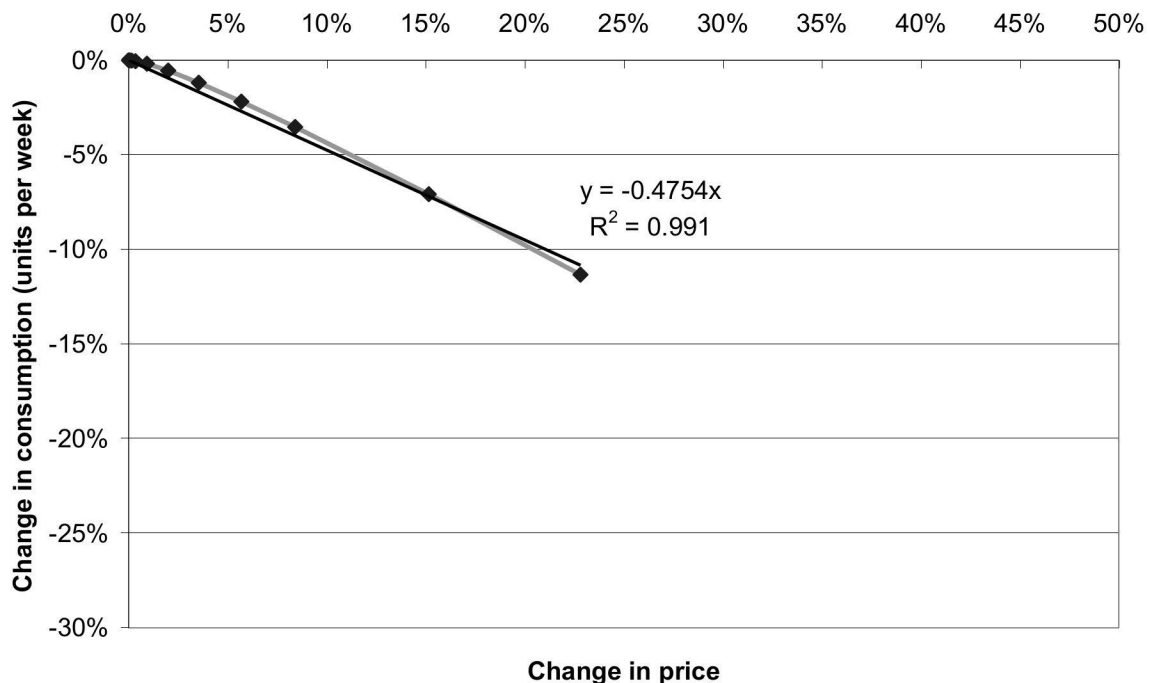
Based upon this, **Cebr's conclusion** was and remains that the Sheffield modelling over-estimates the responsiveness of hazardous and harmful drinkers to changes in price by a factor of two or more. In addition, it significantly underestimates the responsiveness of moderate drinkers to price changes.

Minimum price increases

The issues we observed above also appeared to Cebr to be carried through to the Sheffield team's modelling of the impact of minimum price changes. Based upon the results presented in Tables 40-42 of the original Sheffield (Phase B) report, we estimated the implied average price changes as a result of minimum pricing, along with the modelled average change in alcohol consumption for moderate, hazardous and harmful drinkers.

The following charts show the Sheffield model's predicted changes in consumption for moderate, hazardous and harmful drinkers based upon the percentage changes in overall prices predicted by Sheffield to result from minimum pricing levels of between 15 pence per unit and 70 pence per unit. These show that the impact on average price levels is highest for harmful drinkers and lowest for moderate drinkers, which is consistent with the finding that heavier drinkers tend to consume cheaper alcohol products per unit of alcohol, and tend to consume a larger proportion of their alcohol from the off trade. However, even once this is taken into account, we still observed a much stronger relationship between changes in price and consumption levels for hazardous and harmful drinkers than we did for moderate drinkers. In addition, the overall level of responsiveness of hazardous and harmful drinkers to price changes is much greater than we would expect given the evidence base on price elasticities.

Figure 3: Impact of minimum pricing on average prices and consumption levels of moderate drinkers, based upon University of Sheffield report ¹⁰



¹⁰ Based upon results in tables 39, 40 and 41 of University of Sheffield Phase B report

Figure 4: Impact of minimum pricing on average prices and consumption levels of hazardous drinkers, based upon University of Sheffield report ¹¹

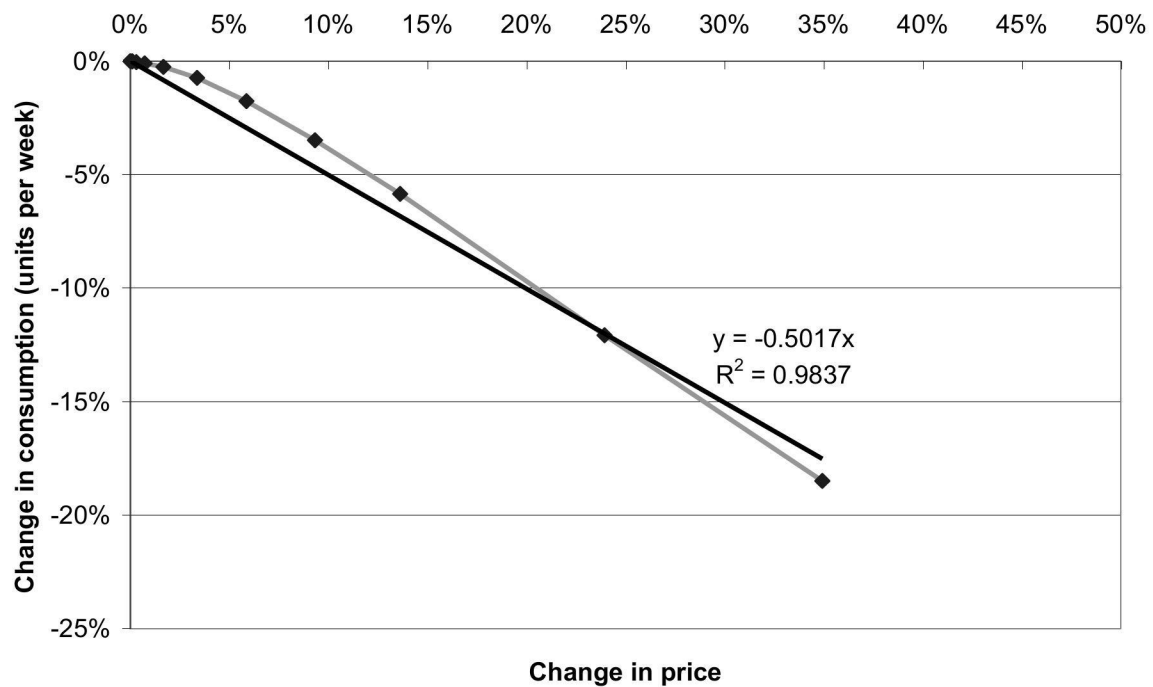
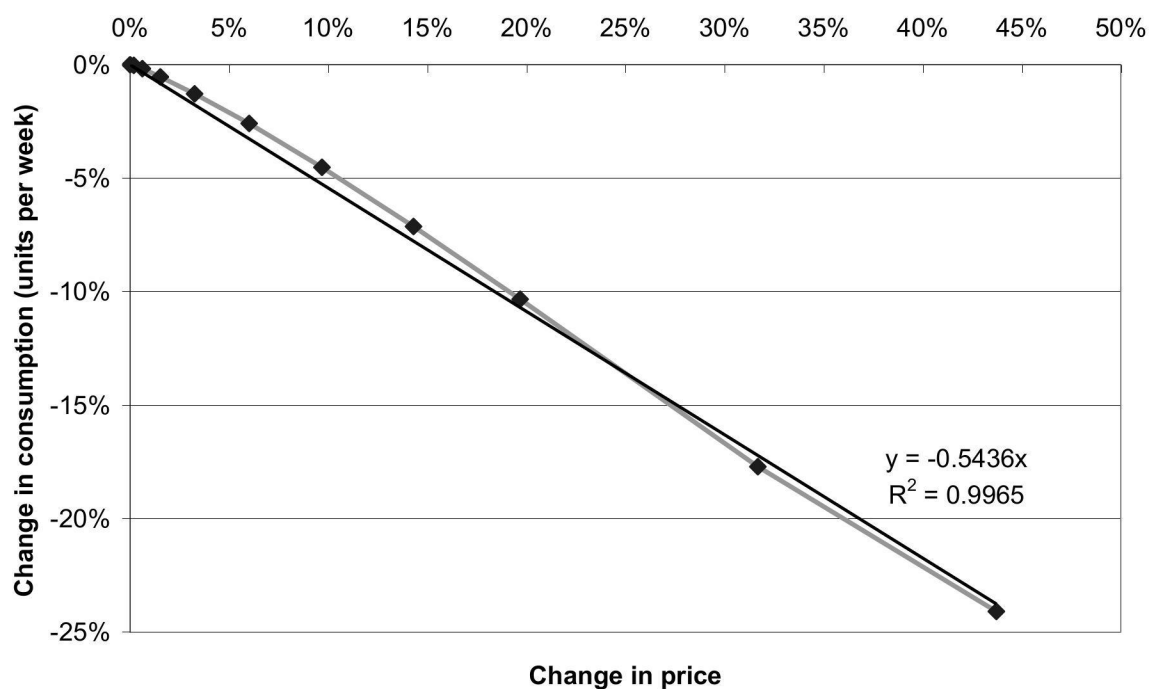


Figure 5: Impact of minimum pricing on average prices and consumption levels of harmful drinkers, based upon University of Sheffield report ¹²



¹¹ Based upon results in tables 39, 40 and 41 of University of Sheffield Phase B report

¹² Based upon results in tables 39, 40 and 41 of University of Sheffield Phase B report

2.4 Cebr's view of the evidence from Canada

The analysis of social reference pricing in Canada, with which Cebr is intimately familiar, estimates the effects of minimum alcohol pricing on the consumption of different alcoholic beverages (and on all alcohol beverages taken together) for the population of each of two provinces, namely British Columbia and Saskatchewan.¹³ But neither analysis accounts for the existence of a spectrum of different types of drinker amongst this or any other population of alcohol consumers.

Since heavy drinkers are the most likely group to suffer alcohol-related harms, this omission means that these papers' statistical results provide little evidence for its conclusion - "minimum pricing [is likely to] reduce the ... health burden associated with hazardous [or harmful] alcohol consumption". In short, the paper draws a conclusion relating to specific types of drinker, inferred from an analysis of drinkers in general, without providing evidence that the inference is valid.

The more an individual drinks, the more he or she is likely to suffer from alcohol-related harms. To effectively reduce these harms, alcohol policy should be well-targeted, involving measures that reduce the alcohol consumption of the typical harmful drinker more than that of the typical hazardous drinker, and of the typical hazardous drinker more than the typical moderate drinker. Minimum pricing policies that affect drinkers the other way around would impose a heavy burden on moderate drinkers while doing comparatively little to decrease hazardous and harmful drinkers' alcohol consumption.

This crucial "targeting" consideration was not factored into the Stockwell et al analysis of either British Columbia or Saskatchewan. Rather, they estimated the responsiveness of total and beverage-specific alcohol consumption to changes in the social reference prices of various alcoholic beverages across the entire populations of these provinces. Their failure to isolate the responsiveness of hazardous and harmful drinkers to minimum pricing policies means they had little basis for accurately assessing how well-targeted or effective the policy has been in reducing alcohol-related harm. The Saskatchewan paper's conclusion, that "minimum pricing reduce[s] the ... health burden associated with hazardous [or harmful] alcohol consumption", does not follow from its analysis precisely because that analysis did not examine the extent to which the pricing policies impact the alcohol consumption levels of the target (hazardous and harmful) types of drinker.

2.5 Conclusions

Based upon our analysis, we remain of the view that the University of Sheffield's price-consumption model appears to overestimate the potential impact of price changes on consumption levels of hazardous and harmful drinkers – we estimate that the results are out by a factor of two.

Moving forward in time to the **Home Office's Impact Assessment**, it is apparent that these overestimates have, likewise, been carried through to the Home Office analysis, which is itself based on the same Sheffield model. The IA presents significantly larger reductions in the consumption levels of hazardous and harmful drinkers in response to the 45p MUP than of moderate drinkers. For the reasons outlined in the preceding analysis, these results **are inconsistent with the evidence base on the relationship between price and alcohol consumption for different types of drinker**.

¹³ See "Does minimum pricing reduce alcohol consumption? The experience of a Canadian province" by Tim Stockwell et al, forthcoming in *Addiction* and "The Raising of Minimum Alcohol Prices in Saskatchewan, Canada: Impacts on Consumption and Implications for Public Health" by Stockwell et al (2012), forthcoming in *The American Journal of Public Health*.

Based on this and our view of the evidence from Canada, Cebr would contend that **it is certainly not the case that** “there is clear evidence to suggest that MUP will reduce consumption of harmful and hazardous consumers”, as stated in the Home Office IA.

Furthermore, because the estimates of consumption impacts from the Sheffield model are the key driver of the Home Office’s quantifications of the health and crime-related benefits of MUP, one cannot help but question the robustness of those quantifications. **Alcohol-related harms are most closely associated with hazardous and harmful drinking. But, if the estimates of the reductions in harmful and hazardous drinking as a result of MUP are overestimated, then estimates of the benefits of the policy in terms of reducing those harms must also be overestimated.**

3 Other shortcomings of the Home Office IA

Policy that impacts on the individual consumer of a product and on wider society through that (and other) individual consumer's consumption of the product should be considered from the point of view of both the individual consumer and from a wider societal perspective.

As outlined in section 1 above, the intended effect of a minimum unit pricing policy is "to reduce the harms associated with excessive consumption such as the number and associated costs of alcohol related crimes; alcohol related health problems, and deaths due to alcohol." These are among the wider consequences of the policy, along with the likely impact on business productivity as a result of reduced absence from work arising from less drinking, which feature in the Home Office analysis but are not quantified.

However, minimum unit alcohol pricing will also have an effect on the direct harms to individual alcohol consumers in terms of their personal health and resultant quality of life, and in terms of their job prospects. These potential benefits must be weighed against the costs to individual consumers, who would have to pay more for alcohol products.

This section considers the extent to which the IA captures all of the likely benefits and costs to both individual consumers and to wider society of a MUP policy.

3.1 Failure to consider lost utility from alcohol consumption

As a result of minimum pricing, consumers would end up spending more overall on alcohol products, as overall demand for alcohol is relatively inelastic to price. These impacts on consumers' expenditure on alcohol are taken into account in the IA. However, we have already highlighted how the University of Sheffield's price-consumption model (on which the Home Office IA is based) overestimates the impact of price changes on the consumption levels of hazardous and harmful drinkers, and underestimates the impact on moderate drinkers. **For this reason, the estimates of the impact on consumer spend on alcohol presented in the IA cannot be seen as robust.** (See next subsection.)

A cost to individual consumers that is not considered in the IA is the loss of utility from any reductions in alcohol consumption that would result from the MUP policy. Neither are these costs accounted for in the Sheffield model, as we found in 2009. In economics, utility is defined as a measure of the relative satisfaction from, or desirability of, consumption of various goods and services. In the case of alcohol consumption, utility is the enjoyment that people derive from drinking alcohol products. This is a key potential cost of a MUP policy and an entirely legitimate element of the cost-benefit equation. Indeed, the original University of Sheffield report acknowledged that the valuation of 'drinkers pleasure' is an area of further research. Cebr, in its 2009 report, attempted to place a value on this lost utility due to increased alcohol prices.

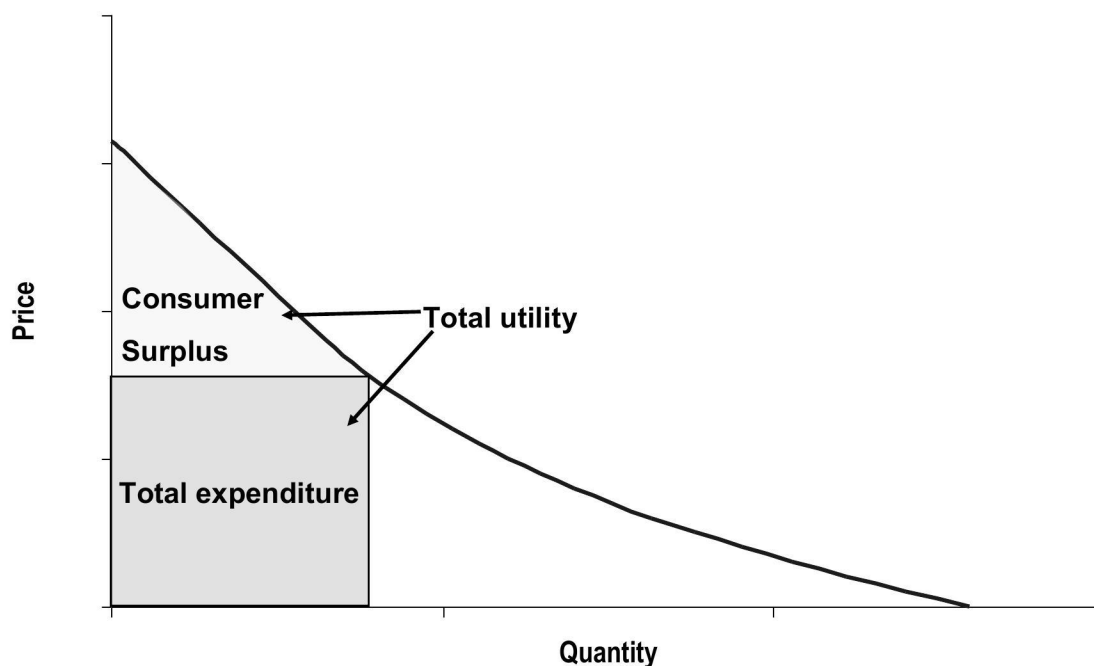
The starting point in measuring utility is a simple concept: consumers will only pay for a good or service if they think it is worth at least as much as the price of that good or service. For example, if someone pays £3.50 for a bottle of beer, this means that the enjoyment of this beer must be worth at least £3.50 to this individual. Otherwise they would not be willing to pay.

Price elasticities of demand facilitate the calculation of utility across the full range of prices and consumption because they help in understanding how much consumers are collectively willing to consume at each price level. For example, a price elasticity of demand of -0.5 tells us that consumption would fall by 5 per cent given a 10 per cent price rise. This means that at the initial

price level, 95 per cent of custom would have been prepared to pay at least 10 per cent more than the initial price level.

Figure 6 illustrates this using a demand curve. The demand curve measures the level of demand for a good or service at each price level. The slope of the curve is determined by price elasticity of demand, or how responsive demand is to changes in price. It is not normally possible for producers to price discriminate within a given market – they cannot charge individual consumers on the basis of how much they are willing to pay – producers instead have to charge an average price. This means that most consumers pay less for a good or service than they would actually be willing to pay, meaning that they get some additional utility above and beyond the actual price. A good proxy for this additional utility is known as the consumer surplus, making the proxy for total utility equal to the sum of the price paid plus the consumer surplus for all consumers.

Figure 6: Demand curve with illustration of consumer surplus and total utility



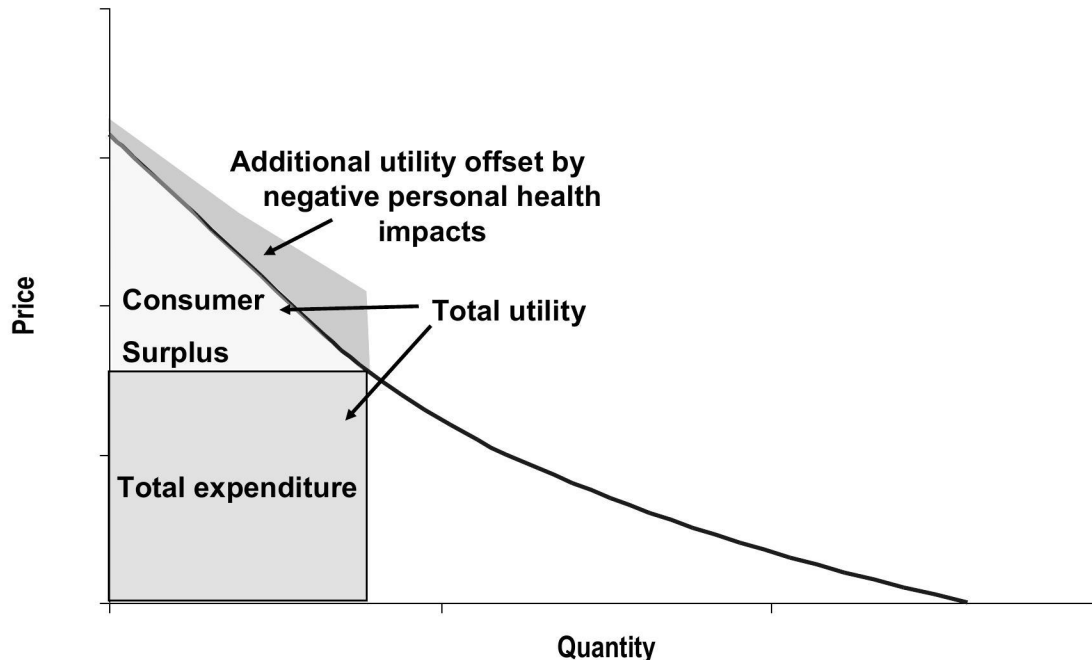
However, the measurement of utility for alcohol products is slightly more complex than for regular products, because of the side effects, and the potentially irrational behaviour associated with excess consumption. In economic theory, we assume that all consumers are rational. The 'rational consumer' takes account of all of the personal benefits and costs in their consumption decision. In the case of alcohol consumption, this would mean that the consumer would not only take account of the pleasure they gain from drinking alcohol, but also the costs, which would include:

- Hangover
- Poor work performance
- Negative health effects

This means that the completely rational consumer factors in all of these potential negative side effects of alcohol consumption in weighing up whether they are willing to pay for the product. **By this rationale, the enjoyment element of alcohol consumption is actually greater than overall utility – which takes account of these side effects – for the rational consumer. In simple terms,**

consumers would be willing to pay more for alcohol products if there were no significant negative side effects associated with alcohol consumption. Figure 7 illustrates this in the context of the demand curve and total utility.

Figure 7: Demand curve with illustration of consumer surplus and total utility



Here we can see that if only the enjoyment of alcohol was taken into account, the consumer surplus above and beyond the purchase price would be significantly higher. Indeed, producers and retailers could without doubt charge higher prices for their product. However, the overall utility of alcohol is dampened by the short-term and long-term negative consequences of excessive consumption, and the rational consumer would take this into account in their consumption decision.

In reality, there is no such thing as a completely 'rational' consumer, as the completely rational consumer is assumed to have perfect information about all aspects of their consumption decisions, including the short-term and long-term implications of those decisions. It is, however, entirely reasonable to assume that most drinkers do factor in at least some of the potential side effects of drinking in their consumption decisions.

In order to properly recognise this, it is necessary to consider how much consumers would be willing to pay for alcoholic beverages if there were no negative short-term or long-term negative side effects. In the absence of such information, there is a need to use an approximation of consumers' perceptions of the negative side effects of drinking. Given that the valuation of QALYs (quality-adjusted life years) provides a basis for measuring the negative personal side effects of drinking in terms of health impacts, it also seems reasonable to assume that this can be used as a basis for measuring consumers' perceptions and potential valuation of negative side effects.

Suitable assumptions about the rationality of different types of consumers can be used to estimate these impacts. For the purposes of Cebr's 2009 study, we assumed that:

- Moderate drinkers are rational, that is, they are aware of the short-term and long-term impacts of drinking and factor this into their consumption decisions.

- Hazardous drinkers are 'semi rational', that is, aware of the short-term and long-term impacts of drinking, but are unaware that their consumption levels are more dangerous than moderate drinkers.
- Harmful drinkers are irrational, that is, they are unable to evaluate the harmful impacts of drinking and cannot take this into account in their consumption decision

The Home Office IA does not deal adequately with the loss of utility arising from lower alcohol consumption, stating on page 12 that:

"By raising the minimum price of alcohol there will be a loss in aggregate consumer surplus. With an accompanying rise in producer surplus (consumers pay more, retailers earn more), the net effect is apparently zero. However, economic theory holds that the imposition of a minimum price above that set naturally by the market leads to the loss of some transactions that would have taken place before. This is known as deadweight loss. It implies that the imposition of a MUP will lead to a decrease in net social welfare."

However, the IA says nothing about the fairness implications of the transfer from consumers to producers. **Neither does the Home Office IA makes any attempt to quantify the value of either of these losses. This is a significant shortcoming of the IA.**

3.2 Underestimation of financial impact on consumers

The IA states that moderate drinkers would face very little cost increase as a result of minimum pricing. However, whilst the IA's definition of moderate drinkers is sound (anyone that drinks less than the recommended maximum weekly intake of 21 units for males and 14 units for females), what is not explicit in the report is that moderate drinkers cover a huge range of different types, from someone that drinks perhaps a glass of wine per month, to someone that drinks two or three small glasses of wine per day.

The result of this was that, on average, moderate drinkers, as defined in the original Sheffield report, were assumed to drink only 5-6 units per week. Clearly this means that any change in alcohol pricing is not going to have a massive financial impact on what is defined as the average moderate drinker. However, the original Sheffield report also revealed that average consumption levels amongst all drinkers is around 16 units per week. This is still within the moderate drinker range. At this level the financial impact of minimum pricing would be significantly more than it is on average for moderate drinkers.

We have highlighted how the University of Sheffield's price-consumption model (on which the Home Office IA is based) overestimates the impact of price changes on the consumption levels of hazardous and harmful drinkers, and underestimates the impact on moderate drinkers. Back in 2009, Cebr compared the Sheffield modelled forecasts of price changes and impacts on consumption levels as a result of various minimum price levels with revised estimates based upon the demand elasticity evidence presented in section 2 above. These revised estimates are consistent with the wider evidence base on price elasticities presented in the original University of Sheffield report.

Our findings suggested that minimum pricing is likely to have the desired effect of increasing the prices faced by harmful drinkers the most because, on average, harmful drinkers tend to consume a higher proportion of their alcohol from the off-trade, compared with hazardous and moderate drinkers. Hazardous drinkers would also face higher prices than moderate drinkers for the same reasons.

However, Cebr also showed the extent to which the University of Sheffield model appears to overstate the impact of price changes on the consumption levels of hazardous and harmful drinkers. For example, we found that a 50 pence per unit minimum price would increase the average price faced by harmful drinkers by 19.7 per cent. The Sheffield modelling suggested that this would result in a reduction in harmful drinkers' consumption levels of 10.3 per cent. But, based upon the demand elasticity evidence presented in the Sheffield report, we would only expect such price changes to reduce harmful drinkers' consumption levels by 5.2 per cent, or around 3.6 units per week on average.

Moderate drinkers would on the other hand face an average price increase of 8.4 per cent. The Sheffield modelling suggests that this would reduce consumption by just 3.5 per cent, whilst the evidence suggests that the reduction in consumption would be more like 5.0 per cent.

Therefore, whilst minimum pricing would have the effect of targeting heavier drinkers due to their preference for cheaper, stronger alcohol products, it is likely to have a similar proportionate effect on moderate and harmful drinkers in terms of consumption levels. Cebr also showed that the impact on hazardous drinkers' consumption levels is likely to be minimal.

Table 6 and Table 7 below present, for each of moderate, hazardous and harmful drinkers, the monetised impact of various levels of minimum pricing on consumer expenditure, personal health (QALYs), unemployment – all featured in the Sheffield analysis and in the Home Office IA – as well as Cebr's estimates of the impact on consumers' utility. These tables amount to the individual consumer's 'balance sheet' with respect to minimum pricing. But the first is based on the demand elasticity evidence presented in section 2 above, evidence that was presented in but ultimately ignored for the purposes of the original Sheffield report. The second is the consumer's balance sheet under the inconsistent price elasticity assumptions adopted in the Sheffield model. The estimates of lost utility in Table 7 are Cebr's but under these same inconsistent modelling assumptions.

It can be seen that, for moderate drinkers, a MUP of 45 pence per unit implemented across Great Britain means an additional £120 million annual expenditure on alcohol.¹⁴ But moderate drinkers would lose a substantial £348 million in utility (enjoyment) from reduced alcohol consumption. While health benefits would be worth £193 million, the negative net impact is estimated at £275 million. These are Cebr's estimates based on the broader evidence base on price elasticities and are derived from the data in Table 6.

For hazardous drinkers, the forecast value of private health benefits is likely to be massively outweighed by significant increases in expenditure on alcohol. The annual net impact on hazardous consumers under a 45 pence MUP is estimated at over £600 million. Likewise for harmful drinkers, whose increased costs in terms of additional expenditure on alcohol is unlikely to be compensated by improved health and employment prospects.¹⁵

Taking into account the potential impact of minimum pricing on all drinkers, **Cebr concluded at the time of producing these estimates and remains of the view that, given the lack of any new evidence to the contrary, from the average individual drinker's perspective, minimum pricing does not make sense, generating an annual loss of £1.3 billion per annum to all drinkers under a 45 pence MUP.**

¹⁴ This is the present value of the additional expenditure over a 10-year period on an annualised basis. The same applies to all numbers referred to in this analysis. This is the same basis on which the costs and benefits are presented in the Home Office IA.

¹⁵ It could, of course, be argued that the reduced 'utility' from reduced alcohol consumption, along with increased expenditure should be excluded altogether from the balance sheet in the case of harmful drinkers, given that in many cases their alcohol consumption is likely to be irrational.

Table 6: Detailed financial valuation of impact of pricing on individual consumers, Great Britain, based upon evidence-based adjustments to Sheffield modelling (£million, discounted value over 10 years)

	Minimum price	Additional expenditure	Utility (drinkers' pleasure)	Health QALYs	Unemployment	Net impact
Moderate	£0.30	-323	-308	180	0	-451
	£0.35	-594	-912	529	0	-978
	£0.40	-888	-1,956	1,121	0	-1,722
	£0.45	-1,198	-3,483	1,931	0	-2,749
	£0.50	-1,484	-5,463	2,926	0	-4,021
	£0.60	-1,800	-10,491	5,287	0	-7,004
	£0.70	-1,582	-16,245	7,654	0	-10,173
Hazardous	£0.30	-1,030	-112	38	0	-1,104
	£0.35	-2,003	-331	117	0	-2,218
	£0.40	-3,305	-784	263	0	-3,827
	£0.45	-4,972	-1,549	492	0	-6,030
	£0.50	-6,902	-2,623	794	0	-8,731
	£0.60	-11,028	-5,510	1,554	0	-14,984
	£0.70	-15,050	-8,684	2,303	0	-21,430
Harmful	£0.30	-1,327	-333	131	471	-1,057
	£0.35	-2,376	-677	268	879	-1,906
	£0.40	-3,695	-1,203	462	1,461	-2,975
	£0.45	-5,244	-1,936	711	2,228	-4,241
	£0.50	-6,922	-2,875	1,006	3,135	-5,656
	£0.60	-10,262	-5,140	1,638	4,990	-8,774
	£0.70	-13,539	-7,292	2,167	6,265	-12,399
Total	£0.30	-2,680	-753	350	471	-2,612
	£0.35	-4,974	-1,921	914	879	-5,102
	£0.40	-7,888	-3,943	1,846	1,461	-8,524
	£0.45	-11,414	-6,968	3,134	2,228	-13,020
	£0.50	-15,309	-10,960	4,727	3,135	-18,407
	£0.60	-23,090	-21,140	8,480	4,990	-30,761
	£0.70	-30,171	-32,221	12,124	6,265	-44,003

When Table 6 is compared with Table 7, what is most interesting is that they demonstrate that even if the assessment is based directly on the University of Sheffield modelling assumptions, the net impact of minimum pricing on individual consumers appears to be strongly negative, with the net annual loss under a 45 pence minimum price estimated to be £972 million.

Table 7: Detailed forecasts of financial valuation of impact of pricing on individual consumers, Great Britain, directly based upon Sheffield modelling (£million, discounted value over 10 years)

	Minimum price	Additional expenditure	Utility (drinkers' pleasure)	Health QALYs	Unemployment	Net impact
Moderate	£0.30	-360	-219	128	0	-451
	£0.35	-707	-648	376	0	-980
	£0.40	-1,135	-1,390	797	0	-1,728
	£0.45	-1,661	-2,475	1,372	0	-2,764
	£0.50	-2,252	-3,882	2,079	0	-4,054
	£0.60	-3,435	-7,455	3,757	0	-7,133
	£0.70	-4,371	-11,545	5,439	0	-10,477
Hazardous	£0.30	-943	-224	76	0	-1,091
	£0.35	-1,746	-662	233	0	-2,175
	£0.40	-2,679	-1,569	526	0	-3,722
	£0.45	-3,696	-3,099	984	0	-5,811
	£0.50	-4,674	-5,245	1,589	0	-8,330
	£0.60	-6,010	-11,019	3,108	0	-13,921
	£0.70	-6,684	-17,367	4,606	0	-19,445
Harmful	£0.30	-987	-666	263	942	-448
	£0.35	-1,674	-1,355	537	1,758	-734
	£0.40	-2,424	-2,406	924	2,923	-984
	£0.45	-3,155	-3,873	1,423	4,456	-1,149
	£0.50	-3,753	-5,749	2,012	6,270	-1,220
	£0.60	-4,283	-10,280	3,277	9,980	-1,306
	£0.70	-4,664	-14,585	4,334	12,531	-2,384
Total	£0.30	-2,290	-1,109	467	942	-1,989
	£0.35	-4,127	-2,665	1,146	1,758	-3,888
	£0.40	-6,238	-5,364	2,246	2,923	-6,433
	£0.45	-8,513	-9,446	3,779	4,456	-9,724
	£0.50	-10,678	-14,877	5,680	6,270	-13,605
	£0.60	-13,728	-28,754	10,142	9,980	-22,360
	£0.70	-15,720	-43,497	14,379	12,531	-32,306

While it should be noted, of course, that the data presented in the tables above, being for the entire GB drinking population, are not comparable with those presented in the Home Office IA, which are for the drinking population of England, **Cebr is certain that a re-estimation of the data in these tables for England only would reveal very similar outcomes and exactly the same conclusions about the negative net impact that a MUP policy will impose.**

3.3 Unconvincing Sheffield methodology establishing link between alcohol and crime harms and workplace harms

Crime harms

Cebr in its 2009 report pointed to the weakness of the evidence base used by Sheffield University to calculate the impact of changes in alcohol consumption on crime, especially compared to the evidence base used to calculate health harms.

The Sheffield team utilised survey data from The Offending Crime and Justice Survey (OCJS) for 2005.¹⁶ This includes two questions on offences related to alcohol: The first asks if the offender was under the influence of alcohol at the time of the offence, and the second asks the offender what, in

¹⁶ Home Office. Research, Development and Statistics Directorate. March 2007

their opinion, were the reasons why they committed the offence – using a multiple choice list of responses including alcohol use.

Not surprisingly, the first question yields a stronger relationship between alcohol and crime than the second, as by definition the second question assumes that the offender has answered ‘yes’ to the first question. The Sheffield team have used the second question to estimate the relationship between consumption and crime – in their view this is a conservative estimate as it yields a lower estimate than the first question. But this is in contrast to the Home Office update for the purposes of Cabinet Office costings of alcohol-related crimes, which used results from the first question.¹⁷

While we accept the Sheffield team’s assertion that their approach is conservative, we did have concerns about how the relationships between consumption and propensity to commit crime have been derived.

Firstly, the fact that an offender claims that alcohol consumption was a primary reason for committing an offence does not seem to be cast iron evidence that the crime was actually committed because of alcohol consumption, as some respondents may wish to blame their behaviour on being drunk rather than take full responsibility for their actions. However, this may be balanced by the probability that some respondents may not wish to attribute their offences to alcohol.

Secondly, Sheffield used two possible survey responses to calculate the attribution of alcohol as a reason for committing crime – firstly, that the respondent was under the influence of alcohol only, and, secondly, that the respondent was ‘under the influence of alcohol and other drugs’. In some cases, the addition of the ‘under the influence of alcohol and other drugs’ response more than doubles the assumed influence of alcohol on the propensity to commit crime. As we can see from Figure 8 overleaf, in the case of males aged between 16-25, the violent crime figures are more than doubled by the ‘alcohol and other drugs’ category, whilst for females of the same age category the violent crime figures are increased by a factor of ten and more. In summary, the introduction of other drugs into the equation must surely lead to an overestimate of the impact of reducing alcohol consumption.

Finally, using this rather unconvincing data, the Sheffield team extrapolated linear functions of relative risk of committing different types of crime, split by age group and gender, relative to the maximum daily amount of alcohol consumed in a given week. Not only were we not convinced by the input data that went into these functions, it was also clear that there was little or no evidence to support their derived shape.

Intuitively, it must be the case that increased levels of alcohol consumption increase the risk of committing a crime. However, there must be a point at which the relative risk starts to diminish. For example, whilst it may be the case that someone that has consumed ten pints of beer in a single session is twice as likely to commit a crime as someone who has consumed five pints, does it necessarily follow that someone that has consumed fifteen pints is three times as likely to commit a crime? We must remember that the evidence base for the risk functions used by the University of Sheffield is based upon a survey which asks whether the respondent was (a) under the influence of alcohol, and (b) whether they think that being under the influence of alcohol was a factor in their crime.

¹⁷ Department of Health. Safe, Sensible, Social – Consultation on further action. Impact Assessments. July 2008 [online] http://www.dh.gov.uk/en/Consultations/Liveconsultations/DH_086412 (Last accessed: 22 April 2009)

Figure 8: Reproduction of Table 20 from Sheffield Phase B report – attribution of alcohol as a reason for committing crime

Table 20: Attributable fractions used as baseline in our modelling (OCJS 2005)

Crime	N	Reason for committed crime				AAF
		Under the influence of alcohol only	Under the influence of alcohol and other drugs	Other reason	No reason given	
Males Under 16						
Violent disorder	271	0.0%	0.0%	92.8%	7.2%	0.0%
Wounding	118	0.0%	0.0%	93.1%	6.9%	0.0%
Assault without injury	153	0.0%	0.0%	92.5%	7.5%	0.0%
Vehicle related thefts	32	0.0%	0.0%	96.3%	3.7%	0.0%
Burglary, robbery, other theft	214	0.0%	3.2%	87.1%	9.7%	3.2%
Criminal damage	69	1.8%	0.4%	91.4%	6.4%	2.2%
Females Under 16						
Violent disorder	191	0.4%	1.5%	94.1%	4.0%	1.9%
Wounding	91	0.0%	2.2%	91.0%	6.8%	2.2%
Assault without injury	100	0.8%	0.8%	97.0%	1.4%	1.6%
Vehicle related thefts	16	0.0%	59.9%	40.1%	0.0%	59.9%
Burglary, robbery, other theft	133	0.3%	3.4%	93.1%	3.2%	3.7%
Criminal damage	32	4.1%	16.2%	78.0%	1.6%	20.3%
Males 16-25						
Violent disorder	267	5.5%	9.0%	78.5%	6.9%	14.5%
Wounding	132	2.3%	9.0%	78.0%	10.7%	11.3%
Assault without injury	135	8.9%	9.1%	79.1%	2.9%	18.0%
Vehicle related thefts	32	5.3%	0.0%	80.3%	14.4%	5.3%
Burglary, robbery, other theft	183	1.4%	0.0%	84.0%	14.6%	1.4%
Criminal damage	70	24.0%	7.1%	57.2%	11.8%	31.1%
Females 16-25						
Violent disorder	163	1.1%	20.1%	64.7%	14.1%	21.2%
Wounding	88	0.0%	28.3%	61.0%	10.7%	28.3%
Assault without injury	75	2.2%	12.5%	68.1%	17.3%	14.7%
Vehicle related thefts	10	51.4%	0.0%	32.0%	16.6%	51.4%
Burglary, robbery, other theft	134	0.9%	0.4%	91.0%	7.7%	1.3%
Criminal damage	20	4.0%	30.1%	61.1%	4.9%	34.1%

AAF for each crime category from the OCJS (2005) was then mapped the closest offence (Appendix 11).

Workplace harms

Workplace harms are divided into the probability and impact of absence from work due to alcohol consumption, and the probability and impact of unemployment due to alcohol consumption.

In both cases, the evidence base utilised to derive relative risks is light. As the original Sheffield report highlights, “few studies have reported on the association between excessive drinking and unemployment”. The results relating to this analysis must therefore be treated with a degree of caution.

In the case of unemployment, Sheffield only assumed that harmful drinkers are susceptible to unemployment as a result of their drinking levels, and that the relative risk of unemployment varies with the extent of this harmful drinking. This seems to be a sensible assumption. However, in calculating the potential benefit to individuals coming back into employment due to reduced alcohol consumption, the Sheffield team utilised average salary levels. This may lead to an overstatement of the benefits, as there is much evidence to suggest that high levels of alcohol consumption are more prevalent amongst low-income groups.

Same flaws with Sheffield estimates of reduced crime and workplace harms due to MUP

As with the impacts on individual consumers outlined in the previous section, Cebr noted in its 2009 report that the Sheffield University estimates of the reductions in health, crime and workplace harms are subject to adjustment based upon the evidence that Sheffield's modelling appears to over-estimate the relationship between price and consumption for heavier drinkers.

Cebr's estimates made in 2009 based on the wider evidence base on the link between price and alcohol consumption show significant reductions in the savings that can be expected to be made in these areas. Furthermore, regardless of what price elasticity assumptions are used, the potential benefits to wider society are minimal compared with the aggregate net cost to individual consumers.

Cebr is again certain that a re-examination of these data for England only would reveal very similar outcomes and exactly the same conclusions about the negative net impact that a MUP policy will impose.

3.4 Other weaknesses of the Home Office IA

Distributional impacts: the Home Office IA does not attempt to quantify the impact of a MUP policy on different income groups despite the fact that this is an essential part of assessing the fairness of the policy. Whilst hazardous and harmful drinking amongst lower and higher income groups is to be discouraged, responsible drinkers in lower income groups are much more likely to be significantly negatively by MUP than responsible drinkers in higher income groups.

Inflation impacts: the IA acknowledges that MUP could add 0.2 per cent to inflation in the year when it is introduced. But not only will this squeeze already squeezed real incomes, it also means that welfare benefits (which are linked to inflation¹⁸) will be uprated by a higher amount, imposing an additional cost on Government. But this will also impact consumers through other channels (such as, railway transport costs which are also linked to inflation). The costs to Government are in addition to the lost alcohol duty revenue as consumption falls, while the cost to consumers is in addition to the additional expenditure on alcohol and the lost utility from consuming less.

Options considered: the IA compares Option 2 involving the introduction of a MUP of 45 pence with Option 1, the so-called "do nothing" option. But, it is not clear that this is the appropriate comparison and may well do a disservice to other existing and planned initiatives to reduce excessive alcohol consumption. The relevant comparison, in other words, should be between option 2 and an option that takes account of the effects of these other initiatives.

Pricing strategies: the introduction of a MUP could well provide incentives for alcohol producers to adopt new pricing strategies. For instance, the price of premium beverages could be reduced in

¹⁸ The caveat to this is the recent Autumn Statement in which the Chancellor announced the intention to uprate welfare benefit payments by 1 per cent per annum for three years. However, state pension benefits will still be uprated by inflation.

response to the MUP in the hope of gaining market share during the period of upheaval, for both consumers and producers. This could, in turn, leave the average price per unit of alcohol little changed. The IA does not discuss these potential price dynamics.

Illicit trade: the incentive for consumers to seek illegitimate sources for alcohol in response to a general increase in the prices of products that were, before the introduction of a MUP, once relatively cheap. Greater use of the illicit trade would mean, of course, lost tax revenues for Government, but also its own set of health-related risks to the individual consumer and to wider society. Additional enforcement costs would also be imposed on the public sector in order to stem the growth in illicit trade.

Impact on competition: the IA does not attempt to quantify or monetise the potential detriment to competition in the UK alcohol industry or to trade between the Member States of the European Union. The consistency of minimum unit pricing with the competition rules is currently the subject of court proceedings in Scotland and is also being considered by the European Commission.