Modelled income group-specific impacts of alcohol minimum unit pricing in England 2014/15:

Policy appraisals using new developments to the Sheffield Alcohol Policy Model (v2.5)

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Contents

Index of Tables

Index of Figures

1 EXECUTIVE SUMMARY

1.1 MAIN CONCLUSIONS

Estimates from a new updated version of the Sheffield Alcohol Policy Model (version 2.5) suggest:

1. Minimum unit pricing (MUP) policies would be effective in reducing alcohol consumption, alcohol-related harms (including alcohol-attributable deaths, hospitalisations, crimes and workplace absences) and the costs associated with those harms.
2. Moderate drinkers would experience only small impacts from MUP policies. Somewhat larger impacts would be experienced by hazardous drinkers, and the main substantial effects would be experienced amongst harmful drinkers.
3. MUP policies would have larger impacts on low income harmful drinkers than higher income harmful drinkers although both would be affected substantially. The impact on low income moderate drinkers would be small in absolute terms.

1.1 BACKGROUND TO THIS REPORT

This report was produced at the request of the UK Government to inform consultation and impact assessments around policy options for alcohol pricing arising from the publication of *The Government's Alcohol Strategy* in March 2012 [1]. Drafts of the report were provided to the Home Office, Department of Health and HM Treasury in February and March 2013. The substantive conclusions of the report have remained unchanged throughout this process. An addendum to the report was produced shortly before publication in June 2013 which provides the results of additional appraisals of the Government's current policy of a ban on below cost selling. Results of this analysis were also provided to the UK Government ahead of publication.

1.2 SCOPE OF RESEARCH

This report summarises results from analyses using a new version of the Sheffield Alcohol Policy Model (SAPM2.5) to examine the likely impact for the population of England of introducing a minimum unit price for alcohol as proposed by the UK Government in its Alcohol Strategy [1].

The new version builds on work previously published in 2009 using the Sheffield Alcohol Policy Model version 2.0 (SAPM2) [2, 3]. Since 2009, the methodology that underpins SAPM

has been further developed and new data have been incorporated. The key model developments and new data are:

- How sensitive are consumers to changes in price?: New econometric modelling has been developed to estimate price elasticities of alcohol demand using Living Cost and Food Survey (LCF) data. In addition to using new methods for estimating price elasticities, LCF data from 2001/2 to 2009 [4] is used (the previous model used 2001/2 to 2005/6 data). Sensitivity analyses addressing the econometric modelling are extended and include analyses using an econometric model developed independently by HMRC.
- A specific focus on low income groups: In addition to the population being separated into subgroups for gender, age and drinking level (moderate/hazardous/harmful[1]), the population is now also categorised into low income (below the relative poverty line defined as 60% of median equivalised household income) and higher income (i.e. above the relative poverty line). Therefore, income-specific impacts of policy interventions such as minimum unit pricing (MUP) can now be estimated for alcohol consumption and alcohol-related harms to health.
- The separation of cider as a distinct beverage type: cider has been separated from beer and the 10 beverage types modelled here are off/on-trade beer, cider, wine, spirits and ready-to-drink beverages (RTDs or alcopops).
- An exclusive focus on the 16 plus age range: the revised model now focuses only on the population aged 16 and over.
- Updated to use the latest alcohol consumption data: new consumption data from the General Lifestyle Survey (GLF) has become available for 2009 (the previous model used 2006 data).
- Updated to use the latest information on alcohol prices: The Home Office and NHS Health Scotland have procured market research data on the overall 2011 price distribution of off-trade and on-trade alcohol in England from The Nielsen Company and CGA Strategy respectively. The LCF 2001/2 to 2009 data has also been used to update model inputs on prices paid by population subgroups.

[1] As in our previous analysis, we define moderate drinkers as individuals whose alcohol intake is up to 21 units per week for men or 14 units per week for women and non-drinkers are included in this group; hazardous drinkers as between 21 and 50 units per week for men; or between 14 and 35 units for women; and harmful drinkers as over 50 units per week for men and over 35 units for women.

- Updated to use the latest information on crime: new crime volume and costs data for 2011 has been incorporated.

1.3 RESEARCH QUESTIONS

What is the estimated impact of the Government's proposed policy of introducing a 45p minimum price per unit of alcohol? The policy is modelled prospectively for the year 2014/15, and 45p in 2014/15 prices is deflated back to 2011 prices for use in the model.

How would that impact vary if a lower minimum price of 40p per unit or a higher minimum price of 50p per unit were implemented instead?

How do these impacts vary by drinker group (moderate, hazardous, harmful) and by income group?

1.4 SUMMARY OF MODEL FINDINGS

1.4.1 Patterns of drinking and expenditure

F1. Analysis of current consumption patterns shows that harmful drinkers represent an estimated 5.3% of the adult (16+) population of England. Specifically hazardous drinkers make up 17.5%, moderate drinkers 61.5% and non-drinkers represent 15.7% of the population as a whole. Non-drinkers are defined here as respondents who have not drank alcohol in the last 12 months before the survey date. On average, moderate drinkers consume 5.5 units per week, hazardous drinkers consume 27.2 units and harmful drinkers consume 71.4 units.

F2. These patterns differ by income group. Just over a quarter (27.1%) of the English adult population are classified as low income (using the definition of equivalised household income below 60% of the population median). Non-drinking is much more common amongst the low income group with 26.8% of those with low incomes being non-drinkers compared to just 11.6% of those with higher incomes ($p<0.001$). Harmful drinking is slightly less prevalent in the low income group (4.7% vs. 5.5%, $p<0.001$). Average weekly consumption is lower among low income drinkers than higher income drinkers (12.7 vs. 14.6 units, $p<0.001$); however, this pattern is not consistent across the consumption distribution. Although those with low incomes are less likely to drink and consume less on average when they do so, low income harmful drinkers consume more per drinker than higher income harmful drinkers. On average, moderate drinkers with low income consume less than those with higher incomes

(4.5 vs. 5.8 units, p<0.001), hazardous drinkers consume the same in each income group (27.2 units) but the pattern is reversed for harmful drinkers where those with low incomes consume more on average (76.2 vs. 69.8 units, p<0.001).

F3. A MUP policy would specifically target harmful drinkers who tend to buy more of their alcohol from the cheaper end of the price per unit distribution. Currently, moderate drinkers purchase 12.5% of their alcohol units for less than 45p, compared to 19.5% for hazardous drinkers and 30.5% for harmful drinkers.

F4. Low income harmful drinkers would be targeted more than higher income harmful drinkers, although both groups would be affected. For the low income group, the proportion of all alcohol sold below a 45p MUP threshold to moderate, hazardous and harmful drinkers is 18.4%, 29.0% and 40.7% respectively. The equivalent figures for higher income drinkers are 10.5%, 16.8% and 28.0%.

F5. Harmful drinkers spend a substantial amount of money on alcohol. Low income harmful drinkers are estimated to spend £2,653 per annum and higher income harmful drinkers are estimated to spend slightly more at £2,809 per annum. Hazardous drinkers spend less (£1,018 for low income and £1,169 for higher income) and moderate drinkers substantially less (£64 for low income and £302 for higher income).

F6. A substantial proportion of the alcohol sold in the off-trade (e.g. supermarkets and off-licenses) would be affected by MUP and this differs by type of beverage. For a 45p MUP, the proportion of off-trade sales affected for each beverage type would be 70.2% of cider, 44.8% of beer, 38.5% of spirits, 24.9% of wine and 0.8% of RTDs. On-trade prices in bars, pubs, clubs and restaurants would be largely unaffected, with less than 0.6% of on-trade sales being affected.

1.4.2 Effect of minimum unit pricing on consumption and expenditure

F7. For a 45p MUP, the estimated per person reduction in alcohol consumption for the overall population is -1.6%. In absolute terms, this equates to an annual reduction of -11.7 units per drinker per year. Increasing levels of MUP show steep increases in effectiveness in terms of alcohol consumption reductions (40p = -1.0%, 45p = -1.6%, 50p = -2.5%).

Table 1.1: Estimated effects on alcohol consumption

		Population	Low income	Higher income	Moderate	Hazardous	Harmful
% population			27.1%	72.9%	77.2%	17.5%	5.3%
% non-drinkers		15.7%	26.8%	11.6%	20.3%	0.0%	0.0%
Baseline consumption (units per week per drinker)		14.1	12.7	14.6	5.5	27.2	71.4
% alcohol purchased below 45p		23.2%	31.5%	20.9%	12.5%	19.5%	30.5%
% change per person	MUP 40p	-1.0%	-2.7%	-0.5%	-0.3%	-0.3%	-2.3%
	MUP 45p	**-1.6%**	**-4.3%**	**-0.9%**	**-0.6%**	**-0.7%**	**-3.7%**
	MUP 50p	-2.5%	-6.2%	-1.5%	-1.0%	-1.2%	-5.4%
	Price +10%	-5.0%	-6.0%	-4.7%	-4.4%	-4.7%	-5.8%
Change per drinker per year (units)	MUP 40p	-7.2	-17.9	-3.8	-1.0	-4.8	-86.7
	MUP 45p	**-11.7**	**-28.2**	**-6.7**	**-1.6**	**-9.5**	**-136.6**
	MUP 50p	-18.2	-41.2	-11.1	-2.7	-17.3	-200.0
	Price +10%	-36.5	-39.9	-35.4	-12.6	-66.5	-215.1

		Low income			Higher income		
		Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
% population		22.8%	3.1%	1.3%	54.5%	14.4%	4.0%
% non-drinkers		32.0%	0.0%	0.0%	15.5%	0.0%	0.0%
Baseline consumption (units per week per drinker)		4.5	27.2	76.2	5.8	27.2	69.8
% alcohol purchased below 45p		18.4%	29.0%	40.7%	10.5%	16.8%	28.0%
% change per person	MUP 40p	-0.9%	-1.7%	-4.8%	-0.2%	0.0%	-1.4%
	MUP 45p	**-1.5%**	**-2.8%**	**-7.5%**	**-0.3%**	**-0.2%**	**-2.3%**
	MUP 50p	-2.3%	-4.4%	-10.6%	-0.6%	-0.5%	-3.6%
	Price +10%	-5.2%	-5.7%	-6.9%	-4.2%	-4.5%	-5.4%
Change per drinker per year (units)	MUP 40p	-2.2	-24.1	-192.5	-0.6	-0.7	-52.8
	MUP 45p	**-3.5**	**-40.0**	**-297.0**	**-1.0**	**-2.9**	**-85.2**
	MUP 50p	-5.5	-62.4	-419.7	-1.8	-7.6	-129.7
	Price +10%	-12.2	-81.2	-274.8	-12.7	-63.4	-195.9

F8. Harmful drinkers (-3.7%) have much larger estimated consumption reductions for a 45p MUP than hazardous (-0.7%) and moderate (-0.6%) drinkers. Low income harmful drinkers (-7.5%) have larger consumption reductions than higher income harmful drinkers (-2.3%). Similarly, absolute annual reductions in units consumed per drinker are much larger among harmful drinkers (-297.0 low income, -85.2 higher income) than hazardous drinkers (-40.0 low income, -2.9 higher income) and very small for moderate drinkers (-3.5 low income, -1.0 higher income).

F9. Estimated annual reductions for other population subgroups of interest include: 16-17 year olds' consumption falling by -0.4% (-2.5 units per year) and consumption by 18-24 year old hazardous drinkers, falling by -1.5% (-21.4 units per year).

F10. For a 45p MUP, spending across the whole population is estimated to change by +0.4% or +£2.60 per drinker per year. Spending increases are larger for hazardous drinkers (£9.70) than moderate drinkers (£0.90). It is estimated that spending would slightly decrease among harmful drinkers (-£1.70) and low income drinkers (-£1.70), but increase among higher income drinkers (+£3.90).

Table 1.2: Estimated effects on consumer spending on alcohol

		Population	Low income	Higher income	Moderate	Hazardous	Harmful
% change per drinker	MUP 40p	0.0%	-0.6%	0.2%	0.0%	0.3%	-0.4%
	MUP 45p	**0.4%**	**-0.4%**	**0.6%**	**0.3%**	**0.9%**	**-0.1%**
	MUP 50p	1.2%	0.1%	1.4%	0.9%	1.8%	0.6%
	Price +10%	4.5%	3.2%	4.8%	5.4%	4.5%	3.4%
Change per drinker per year (£)	MUP 40p	0.1	-2.8	1.0	0.0	3.3	-9.9
	MUP 45p	**2.6**	**-1.7**	**3.9**	**0.9**	**9.7**	**-1.7**
	MUP 50p	7.2	0.5	9.3	2.6	21.1	15.7
	Price +10%	27.4	15.5	31.1	14.8	51.4	95.4

		Low income			Higher income		
		Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
% change per drinker	MUP 40p	-0.7%	-0.2%	-1.2%	0.1%	0.4%	-0.1%
	MUP 45p	**0.4%**	**0.3%**	**-1.4%**	**0.4%**	**1.0%**	**0.3%**
	MUP 50p	2.7%	1.1%	-1.5%	0.9%	2.0%	1.2%
	Price +10%	13.4%	3.3%	2.1%	5.6%	4.7%	3.9%
Change per drinker per year (£)	MUP 40p	-0.5	-2.1	-31.9	0.2	4.5	-2.9
	MUP 45p	**0.3**	**3.0**	**-37.4**	**1.1**	**11.2**	**9.7**
	MUP 50p	1.7	11.5	-39.9	2.8	23.2	33.5
	Price +10%	8.6	33.7	55.3	16.8	55.2	108.2

F11. For a 45p MUP, overall alcohol-related revenue to the Treasury (from duty and VAT receipts) is estimated to change only very slightly by -£48.5m or 0.6% (-17.7m and -£30.9m for off- and on-trade respectively). Revenue to retailers is estimated to increase by £201.1m (+5.6%) in the off-trade and decrease by £62.2m (-0.7%) in the on-trade.

1.4.3 Effects of minimum unit pricing on alcohol-related harms

F12. There are substantial estimated reductions in alcohol-related harm for a 45p MUP. As a time lag is typically observed between reductions in alcohol consumption and changes in rates of some harms to health [5], the full impact of MUP accrues over several years. For a 45p MUP, the estimated reduction in alcohol-attributable deaths is -123 in the first year and -624 per annum from the tenth year onwards. The majority of the reduction in alcohol-attributable deaths is seen among harmful drinkers (554 out of 624).

Table 1.3: Estimated effects on alcohol-related harms for a 45p MUP (2014/15 prices)

		Population	Low income	Higher income	Moderate	Hazardous	Harmful
Year 1	Deaths	-123	-76	-47	-17	-21	-85
	Hospital admissions ('000s)	-5.7	-3.6	-2.1	-0.9	-1.0	-3.8
Year 10: Full effect per year	Deaths	-624	-392	-232	-11	-60	-554
	Hospital admissions ('000s)	-23.7	-15.6	-8.1	-1.4	-1.8	-20.5
	Total crimes ('000s)	-34.2	n/a[1]		-8.9	-10.5	-14.8
	Days absent from work ('000's)	-247.6			-55.8	-73.9	-117.9
Cumulative discounted harm reductions (£m) (Years 1-10)	Healthcare costs	-417.2	-270.4	-146.9	-49.5	-58.4	-309.4
	Crime costs	-1,148.8	n/a[1]		-287.9	-333.5	-527.4
	Absence costs	-224.8			-48.9	-64.6	-111.2
	Total direct costs	-1,790.8			-386.3	-456.5	-948.0
	Total value of harm reduction incl. QALYs[2]	-3,381.9			-627.8	-683.6	-2,070.5

		Low income			Higher income		
		Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
Year 1	Deaths	-9	-16	-50	-7	-4	-35
	Hospital admissions ('000s)	-0.5	-0.8	-2.3	-0.4	-0.3	-1.5
Year 10: Full effect per year	Deaths	-4	-68	-320	-7	8	-234
	Hospital admissions ('000s)	-0.9	-1.9	-12.9	-0.5	0.0	-7.7
Cumulative discounted harm reductions (£m) (Years 1-10)	Healthcare costs	-30.5	-49.0	-190.9	-19.0	-9.3	-118.5
	Total value of health harm reduction incl. QALYs[2]	-182.3	-235.6	-764.5	-112.7	-56.2	-515.0

[1] Income-specific results for crime and absenteeism are not available in SAPM2.5
[2] QALY: quality adjusted life years

F13. Further methodological development of the model is required to account for the extent to which the risks associated with higher alcohol consumption are different for low income and higher income subgroups. We have used national average risk estimates (i.e. equal risks per unit of alcohol consumed for both income subgroups and equal baseline risks). Therefore the estimated reductions in harms presented here for low income groups may be under-estimated, whilst the reductions for higher income groups may be over-estimated. With this caveat stated, larger estimated reductions in deaths per annum are seen amongst low income drinkers (-392) compared to higher income drinkers (-232).

F14. For a 45p MUP, alcohol-attributable morbidity decreases with an estimated reduction of -12,500 illnesses and -23,700 hospital admission per annum across all drinkers 10 years after policy implementation.

F15. Direct costs to healthcare services are estimated to reduce with changes of -£25.3m in year 1 and -£417.2m in total over the first ten years of the policy.

F16. Crime is estimated to fall with -34,200 fewer offences overall. Almost 43% of this annual reduction, or 14,800 crimes, are amongst harmful drinkers and 31%, or 10,500 crimes, is amongst hazardous drinkers. Costs of crime are estimated to reduce by -£138.1m per year.

F17. Workplace absence is estimated to fall by -247,600 days per year.

F18. For a 45p MUP, the total societal value of harm reductions for health, crime and workplace absence is estimated at £3.4bn in total over the 10 year period modelled. In the first year, the estimated societal value of the harm reductions is as follows: NHS direct cost reductions (£25.3m), direct crime costs saved (£138.1m), workplace absences avoided (£27.0m). The total discounted value of harm reductions including health quality-adjusted life years (QALYs)[2] for the first ten years of the policy is £3.4bn. The societal value of harm reductions is distributed differentially across the drinker groups over the 10 year period with reductions in alcohol consumption among harmful drinkers accounting for 61.2% of the total value, hazardous drinkers 20.2% and moderate drinkers 18.6%.

F19. A range of sensitivity analyses (SA) including a probabilistic sensitivity analysis and six alternative price elasticity estimates were performed to test the uncertainty around model estimates. The sensitivity analyses (SA) were: SA1 and SA2 adjusted the base case elasticity matrix; SA3 used separate elasticity matrices for low and higher income groups;

[2] We valued a health QALY at £60,000 in this report to be consistent with the valuations used by the Department of Health.

SA4 used separate elasticity matrices for moderate versus hazardous/harmful drinkers; SA5 used elasticities estimated within a time series analysis of Her Majesty's Revenue and Customs (HMRC) data on alcohol released for consumption or sale in the UK; SA6 used elasticities estimated independently by Her Majesty's Revenue and Customs (HMRC). Each of these sensitivity analyses gives broadly similar results to the base case, which provides marginally the lowest estimated impacts of a 45p MUP of the seven estimates made. Population consumption reduction estimates from the sensitivity analyses range from -1.7% to -3.1% (compared to the base case of -1.6%). Importantly, harmful drinkers are consistently shown to be substantially more affected by a MUP than moderate drinkers and the income group-specific effects seen in the base case are maintained across each of the sensitivity analyses undertaken.

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The Living Cost and Food Survey and the General Lifestyle Survey are Crown Copyright. Neither the Office for National Statistics, Social Survey Division, nor the Data Archive, University of Essex bears any responsibility for the analysis or interpretation of the data described in this report.

2 INTRODUCTION

2.1 BACKGROUND

In 2009, ScHARR developed the Sheffield Alcohol Policy Model version 2.0 (SAPM2) to appraise the potential impact of alcohol policies, including different levels of MUP, for the population of England [2, 6]. Results from SAPM have been influential in informing the policy debate around MUP and, in March 2012, the UK Government included a commitment to introduce a MUP in its alcohol strategy [1, 7]. In November 2012, the Home Office launched a public consultation addressing a range of measures proposed in the strategy including a proposed MUP 45p per unit of alcohol (1 unit = 8g/10ml of ethanol) in 2014/15 prices [8].

Since 2009, the methodology that underpins SAPM has been further developed and new data has become available. This research report combines the new SAPM methodology (referred to here as SAPM2.5) with the latest data available for England to produce new estimates of the potential effects of MUP policies in England.

2.2 RESEARCH QUESTION ADDRESSED

The set of policies analysed are MUP polices with thresholds of 40p, 45p and 50p in 2014/15 prices. We also assume that these price thresholds are held constant in real terms over the length of the 10 year modelling period. The main research questions are concerned with the likely effects of introducing a MUP on alcohol consumption, spending, sales, health, crime and workplace absenteeism in England.

This analysis uses 2011 as the baseline year. Table 2.1 shows the adjusted price thresholds, in 2011 prices for the 40p, 45p and 50p MUP thresholds in 2014/15 prices. These estimates were provided by the Home Office by forecasting future beverage-specific retail price indices (RPIs). Therefore, for example, when appraising the impact of a 45p MUP policy, the actual price thresholds used as inputs to SAPM are 41.2p, 42.3p, 41.2p, 40.1p and 41.8p for off-trade beer, cider, wine, spirits and RTDs respectively and 41.4p, 41.8p, 41.6p, 41.6p and 41.5p for on-trade beer, cider, wine, spirits and RTDs respectively. Hereafter, references to 40p, 45p and 50p MUPs should be read as 2014/15 prices unless otherwise specified.

Table 2.1: Matching MUP thresholds in 2014/15 prices to the model baseline year of 2011

MUP policy in 2014/15		40p MUP	45p MUP	50p MUP
2011 prices (pence)	Off-beer	36.6	41.2	45.7
	Off-cider	37.6	42.3	47.0
	Off-wine	36.6	41.2	45.8
	Off-spirits	35.6	40.1	44.5
	Off-RTDs	37.2	41.8	46.5
	On-beer	36.8	41.4	46.0
	On-cider	37.1	41.8	46.4
	On-wine	36.9	41.6	46.2
	On-spirits	36.9	41.6	46.2
	On-RTDs	36.9	41.5	46.2

3 METHODS

This section outlines the methods used to appraise pricing policies within SAPM. It begins by setting out the main changes to the structure and models parameters used in SAPM2 and then provides a detailed description of methods used at each stage of the analysis.

3.1 NEW FEATURES OF SAPM2.5

Since the publication of results from SAPM2 in 2009, the methodology of SAPM has been further developed. Compared with SAPM2, the revised model has the following new features:

- **New price elasticities of demand:** A new econometric model has been developed to estimate price elasticities of alcohol demand using a pseudo-panel analysis of the annual Living Cost and Food Survey (LCF), previously known as the Expenditure and Food Survey (EFS), data from 2001/2 to 2009. In addition to the methodological change, previous analyses used pooled EFS data from 2001/2 to 2005/6.
- **Revised beverage categories:** In the econometric model and the policy/price-to-consumption (P2C) component of SAPM, cider is now analysed as a separate beverage type to beer and we no longer separate high and low priced products. The 10 beverage types modelled are now off/on-trade beer, cider, wine, spirits and ready-to-drinks (RTDs).
- **Income-based subgroups:** In addition to the study population being separated into subgroups of gender, age and drinking level (moderate/hazardous/harmful[3]), the

[3] As in the previous analysis, we defined moderate drinkers as individuals whose alcohol intake is no more than 21 units per week for men or 14 units per week for women; hazardous drinkers as individuals whose alcohol intake is more than 21 but less than 50 units per week for men; more than 14 but less than 35 units for women; and harmful drinkers as individuals whose alcohol intake is more than 50 units per week for men and more than 35 units per week for women.

population is now also categorised as low income (below 60% of median equivalised household income) or higher income. Income-category specific impacts of policy interventions, such as MUP, can now be estimated for alcohol consumption and alcohol-related harms[4]. By including two income groups, a total of 96 subgroups (defined by gender, 8 age groups, 3 drinker groups, and 2 income groups) are modelled in SAPM2.5.

- **Underage drinkers:** We no longer include 11-15 year olds in SAPM2.5 due to a lack of evidence on both consumption patterns and the relationship between consumption and harms for this young age group. We continue to include 16 and 17 year olds as data on these drinkers is available in the GLF.

A summary of the methodological changes is provided in Table 3.1. Within SAPM2.5, most of the methodological developments have been to the price to consumption (P2C) model, where the changes in alcohol consumption are estimated for price-based interventions such as MUP. In contrast, the methodology of the consumption to harm (C2H) part of the model, where changes in alcohol-related harms are estimated from changes in consumption, has remained largely unchanged. For details of the original methodology of SAPM2, please refer to our previous report [2].

Table 3.1: Summary of methodological changes

Model area	Methodology change	Raw data change	Derived model parameters
Model structure	Yes		
Prices		Yes	
Consumption		Yes	
Health harms			Yes
Crime harms		Yes	
Absenteeism			Yes

3.2 OVERVIEW OF SAPM2.5

The aim of SAPM2.5 is to appraise MUP policy options via cost-benefit analyses. We have broken down the aims into a linked series of policy impacts to be modelled

- The effect of the policy on the distribution of prices for different types of alcohol;

[4] The functionality for deriving income specific impacts for alcohol-related harms has not been fully operationalised in SAPM2.5. Although income-specific harm effects can be seen, these do not account for differential relationships between alcohol consumption and risk of harm between income groups.

- The effect of changes in price distributions on patterns of both on-trade and off-trade alcohol consumption;
- The effect of changes in alcohol consumption patterns on revenue for retailers and the exchequer;
- The effect of changes in alcohol consumption patterns on consumer spending on alcohol;
- The effect of changes in alcohol consumption patterns on levels of alcohol-related health harms;
- The effect of changes in alcohol consumption patterns on levels of crime;
- The effect of changes in alcohol consumption patterns on levels of workplace absenteeism;

To estimate these effects, two connected models have been built:

1. A model of the relationship between alcohol prices and alcohol consumption which accounts for the relationship between average weekly and peak daily consumption and how consumption is distributed within the population. These relationships are modelled for both the total population and for population subgroups defined by gender, age, income and consumption level.
2. A model of the relationship between (1) average weekly and peak daily consumption and (2) harms related to health, crime and workplace absenteeism and costs associated with these harms.

Figure 3.1 indicates the main datasets used to provide different aspects of the picture. The model links evidence from these datasets to enable comprehensive appraisals of the potential impacts of a policy on a range of outcomes of interest.

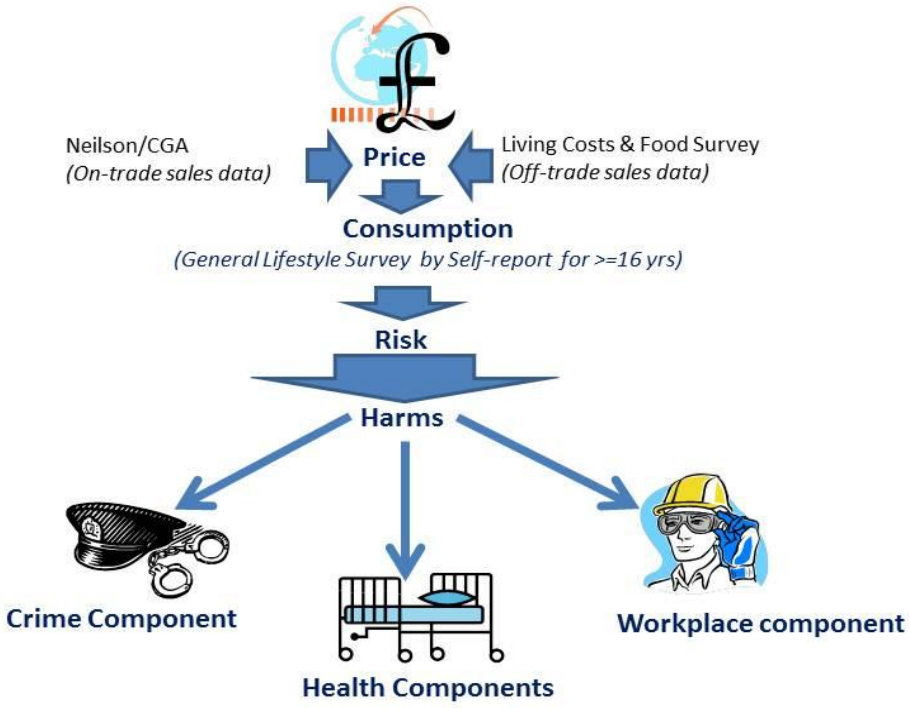

Figure 3-1: Schematic on integrating data sources

3.3 MODELLING THE LINK BETWEEN PRICE AND CONSUMPTION

One major aspect in the modelling exercise was to integrate datasets on price and consumption due to the absence of an English dataset covering both of these components. While the GLF provides good estimates of subgroup-specific alcohol consumption patterns in England, it does not contain information on purchasing. In particular, it provides no information on how much was paid for alcohol consumed or whether it was purchased in the on-trade or the off-trade. Conversely, while the LCF provides a good picture of alcohol purchasing in England, a consumption distribution based on this dataset may not reflect accurately patterns of consumption in England at the subgroup level, as it only covers a two week diary period and purchasers of alcohol are not necessarily the consumers.

The link between price and consumption was thus modelled using different datasets. This section provides an overview of the data sources on alcohol consumption and pricing which were used, before detailing the procedures for modelling the effect of price policies on consumption.

3.3.1 Consumption

The General Lifestyle Survey (GLF), previously known as the General Household Survey (GHS), provides two primary measures of alcohol consumption in units for the 96 subgroups in the model. These are typical weekly consumption over the last year (average weekly) and consumption on the heaviest drinking day during the survey week (peak daily). Both measures can be disaggregated into beverage types. The previous model used data from the 2006 GHS; however data from the GLF 2009 are now available and have been used as the new baseline data in the model.

As in previous versions of the model, the price elasticities used in SAPM 2.5 relate a change in price to a change in mean consumption; therefore an additional step is required to estimate the effects of a change in price on peak daily consumption. As described by Purshouse et al,[2] this is achieved by estimating the average relationship between relative change in mean weekly consumption and relative change in peak daily consumption at subgroup level and using this relationship to estimate how an individual's peak daily consumption changes following a change in mean weekly consumption. The same methodology is applied in this analysis and the resulting model parameters from the GLF 2009 data are shown in Appendix 1.

Figure 3.2 and 3.3 present the distributions of average weekly and peak daily alcohol consumption for males and females in England based on the GLF 2009. Please note that the proportion of respondents reporting zero consumption is larger for peak daily consumption than for mean weekly consumption as it is based only on drinking in the survey week rather than the last year.

Three consumption groups are used in SAPM 2.5; moderate drinkers who consume less than 14 or 21 units per week for females and males respectively, hazardous drinkers who consume 14 to 35 (females) or 21 to 50 (males) units per week and harmful drinkers who consume more than 35 (females) or 50 (males) units per week. From the GLF 2009, 15.7% of the adult (16+) population of England are non-drinkers, 77.2% are moderate drinkers, 17.5% are hazardous drinkers and 5.3% are harmful drinkers. On average, moderate drinkers consume 5.5 units per week, hazardous drinkers consume 27.2 units and harmful drinkers consume 71.4 units.

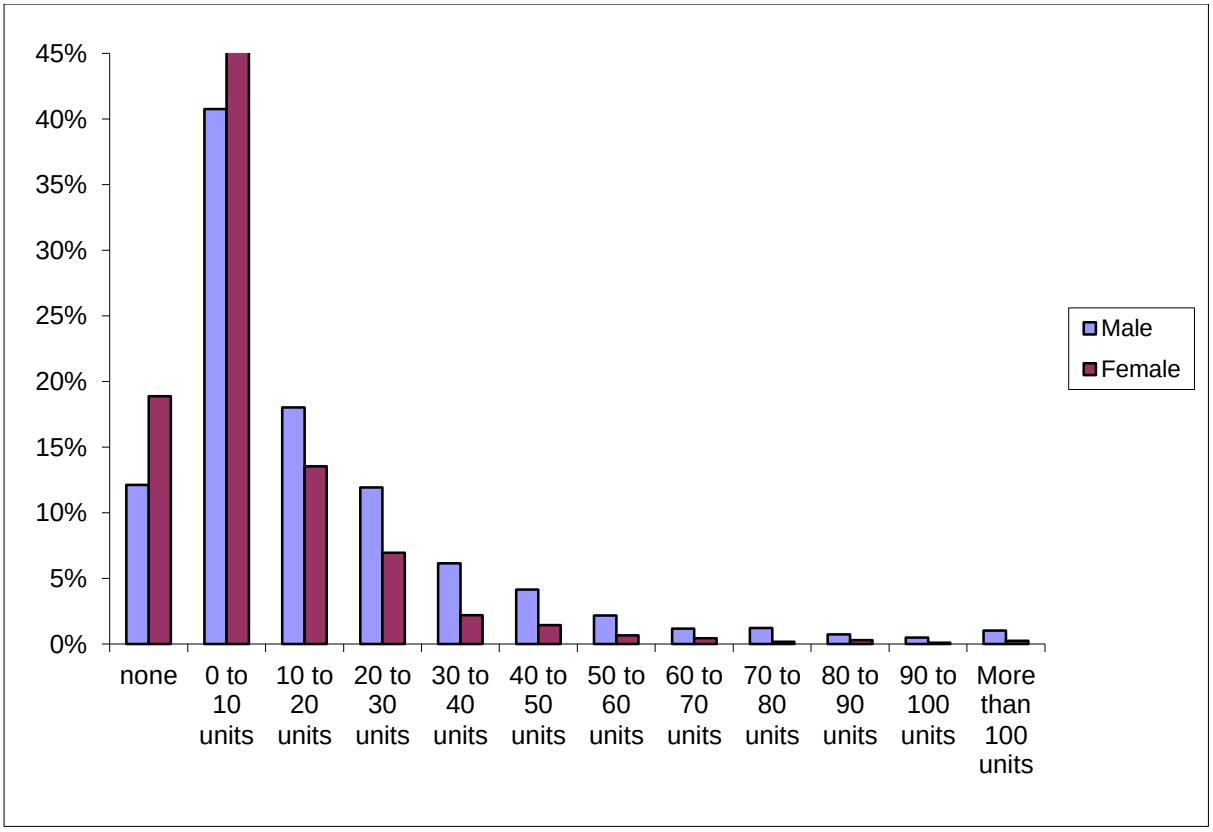

Figure 3-2: Distribution of mean weekly alcohol consumption among individuals in England aged 16 years old and over (GLF 2009)

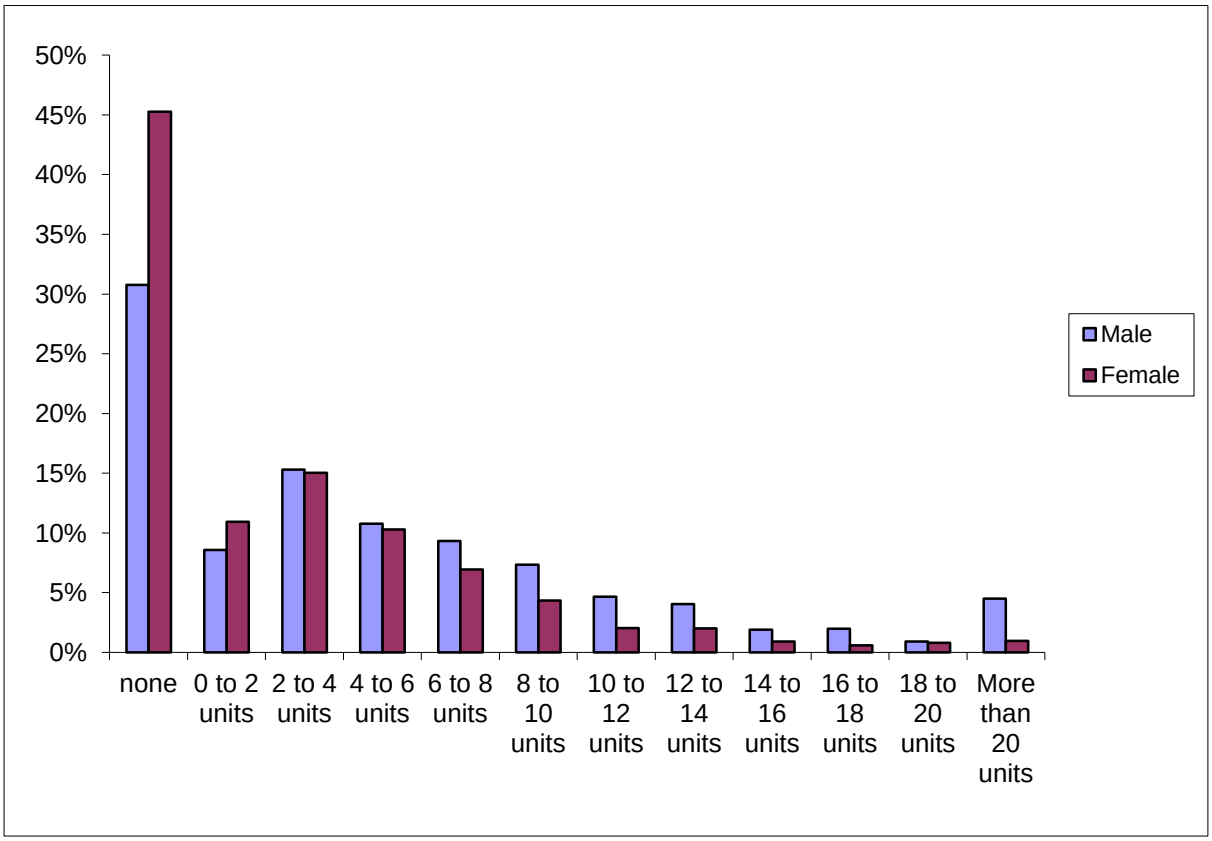

Figure 3-3: Distribution of peak daily intake (units drunk on heaviest drinking day in the last week) among individuals in England aged 16 years old and over (GLF 2009)

Using the income groups defined on page 30, consumption patterns vary by income groups. Non-drinking is much more common amongst the low income group with 26.8% of those with low incomes being non-drinkers compared to just 11.6% of those with higher incomes. Harmful drinking is slightly less prevalent in the low income group (4.7% vs. 5.5%, $p<0.001$). Average weekly consumption is lower among low income drinkers than higher income drinkers (12.7 vs. 14.6 units, $p<0.001$); however, this pattern is not consistent across the consumption distribution. Although those with low incomes are less likely to drink and consume less on average when they do so, low income harmful drinkers consume more per drinker than higher income harmful drinkers. On average, moderate drinkers with low income consume less than those with higher incomes (4.5 vs. 5.8 units, $p<0.001$), hazardous drinkers consume the same in each income groups (27.2 units) but the pattern is reversed for harmful drinkers where those with low incomes consume more on average (76.2 vs. 69.8 units, $p<0.001$).

3.3.2 Prices

In SAPM2 [2], the separate on-trade and off-trade price distributions for beer and cider (combined), wine, spirits and RTDs were based on English purchasing data from the EFS 2001/2 to 2005/6. These were then adjusted at the population level to match England and Wales sales data from the Nielsen Company and England-only data from CGA Strategy[9, 10]. The methods for constructing these distributions are described below. In brief, we have used nine years of LCF data (converted to price per unit and inflated to 2011 prices) to build ten detailed price distributions for beer, cider, wine, spirits and RTDs in both the off- and on-trade. We then adjusted the LCF data to align with the more aggregated (but more accurate), sales data from Nielsen and CGA to ensure that the price distribution matches with actual sales data at known points of the distribution. The LCF data were then interpolated between the known Nielsen and CGA data points and the resulting combined price distributions were disaggregated into the different gender, age, income and drinking level sub-populations (e.g. 18-24 year old, male, low income, hazardous drinkers) using the demographic data in the LCF.

LCF/EFS data is now available from 2001/2 to 2009. As in the original model, individual-level quantities of alcohol purchased are not available in the standard version of the dataset held by the UK Data Archive. However, via a special data request to the Department for Environment, Food and Rural Affairs (DEFRA), anonymised individual-level diary data on 25 categories of alcohol (e.g., off-trade beers, see Table 3.3 for a complete list) detailing both expenditure (in pence) and quantity (in natural volume of product) were made available to

the authors. Therefore, in this analysis, England transaction data from the LCF/EFS 2001/2 to 2009 is used with a total sample size of 227,933 purchasing transactions. These transactions were used for constructing the baseline empirical price distributions for each modelled subgroup and each modelled beverage type (i.e. 960 empirical price distributions in total, with an average sample size of around 220 observations per distribution).

Table 3.2 also shows the matching of the LCF/EFS categories and the 10 modelled categories and the alcohol by volume (ABV) estimates used in the LCF 2009 for converting the natural volume of beverages to ethanol contents.

Off-trade price distributions based on aggregated sales data were compiled by the Nielsen Company for England and Wales in 2011 for beer, cider, wine, spirits and RTDs. These were made available to the authors be NHS Health Scotland [11] and were used to adjust the LCF/EFS off-trade prices using the same methodology as in the original model [2]. The Nielsen company is unable to estimate off-trade sales by Aldi and Lidl from September 2011, and therefore the off-trade price distributions for 2011 are based on off-trade sales excluding these stores [11]. The impact of excluding Aldi and Lidl on off-trade price distributions in Scotland using 2009 and 2010 data was examined and only a marginal impact on the overall off-trade price distribution was detected [11].

Table 3.2: Matching of LCF/EFS product categories to modelled categories and ABV estimates.

LCF/EFS off/on trade	**LCF/EFS category**	**Modelled category**	**ABV estimate**
Off-trade	Beers	off-trade beer	3.9%
Off-trade	Lagers and continental beers	off-trade beer	3.9%
Off-trade	Ciders and perry	off-trade cider	4.8%
Off-trade	Champagne, sparkling wines and wine with mixer	off-trade wine	11.2%
Off-trade	Table wine	off-trade wine	12.7%
Off-trade	Spirits with mixer	off-trade spirits	7.3%
Off-trade	Fortified wines	off-trade wine	14.3%
Off-trade	Spirits	off-trade spirits	39.6%
Off-trade	Liqueurs and cocktails	off-trade spirits	33.3%
Off-trade	Alcopops	off-trade RTD	4.6%
On-trade	Spirits	on-trade spirits	41.8%
On-trade	Liqueurs	on-trade spirits	29.9%
On-trade	Cocktails	on-trade spirits	13.2%
On-trade	Spirits or liqueurs with mixer	on-trade spirits	7.7%
On-trade	Wine (not sparkling) including unspecified 'wine'	on-trade wine	11.1%
On-trade	Sparkling wines and wine with mixer (e.g. Bucks Fizz)	on-trade wine	9.5%
On-trade	Fortified wine	on-trade wine	17.3%
On-trade	Cider or perry - half pint or bottle	on-trade cider	4.8%
On-trade	Cider or perry - pint or can or size not specified	on-trade cider	4.8%
On-trade	Alcoholic soft drinks (alcopops), and ready-mixed bottled drinks	on-trade RTDs	4.6%
On-trade	Bitter - half pint or bottle	on-trade beer	4.3%
On-trade	Bitter - pint or can or size not specified	on-trade beer	4.3%
On-trade	Lager or other beers including unspecified 'beer' - half pint or bottle	on-trade beer	5.0%
On-trade	Lager or other beers including unspecified 'beer' - pint or can or size not specified	on-trade beer	5.0%
On-trade	Round of drinks, alcohol not otherwise specified	on-trade beer	4.8%

Updated CGA Strategy data has also become available for England and Wales in 2011 for beer/cider, wine, spirits and RTDs and this was used to adjust the LCF/EFS on-trade prices. The CGA data was purchased by the Home Office and, although the detailed dataset is not publicly available, the University of Sheffield is permitted to use the data for updating SAPM.

Alcohol-specific RPIs for off- and on-trade beer and off- and on-trade wine and spirits (see Appendix 2) were used to adjust to 2011 prices the data in the LCF/EFS 2001/2 to 2009. The 2011 price could then be aligned with the more accurate but more aggregated sales data from the Nielsen Company data and CGA strategy data using the same methods employed in previous versions of SAPM [6]. All final off- and on-trade price distributions used in SAPM2.5 are in 2011 prices and are calculated for England only. The baseline year of 2011 is chosen for the model because the latest available Nielsen and CGA price data is based on that year. The final England aggregate price distributions for off- and on-trade beer, cider wine, spirits and RTDs in 2011 prices used in the model are shown in Figure 3.4, Figure 3.5 and the proportions of each beverage category sold below different MUP thresholds in 2014/15 prices are shown in Table 3.3.

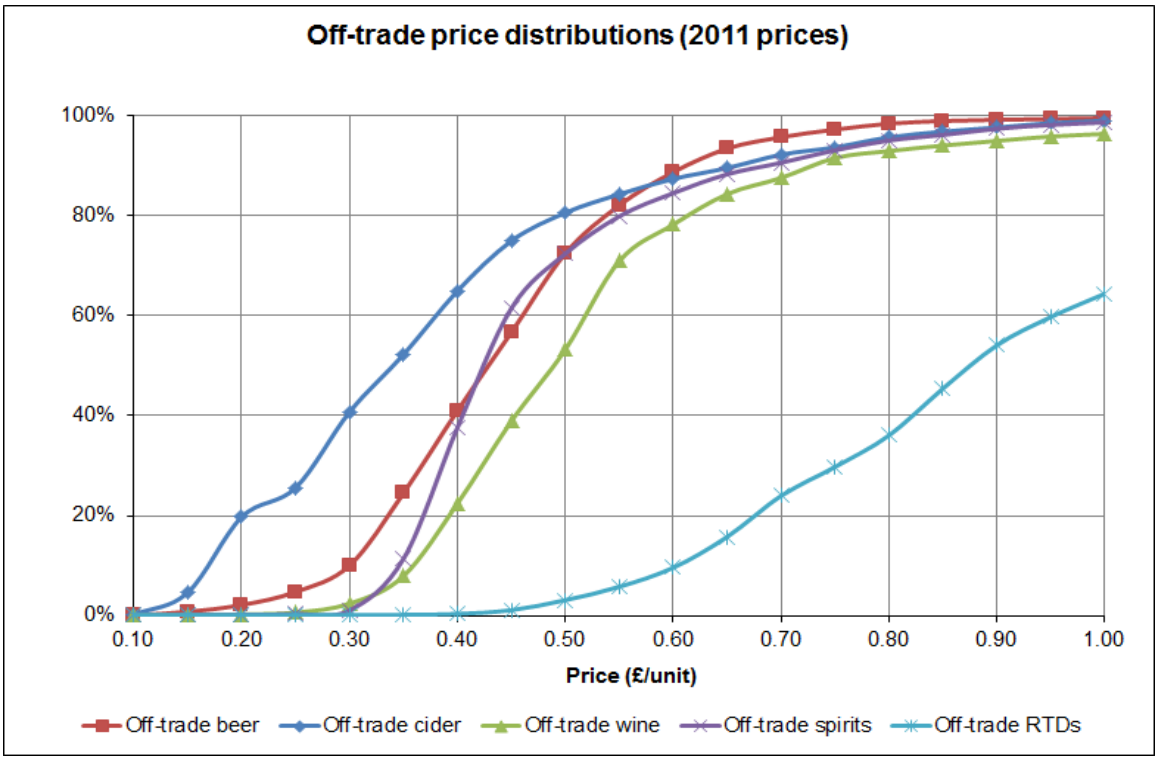

Figure 3-4: Final off-trade price distributions for beer, cider, wine, spirits and RTDs in 2011 prices

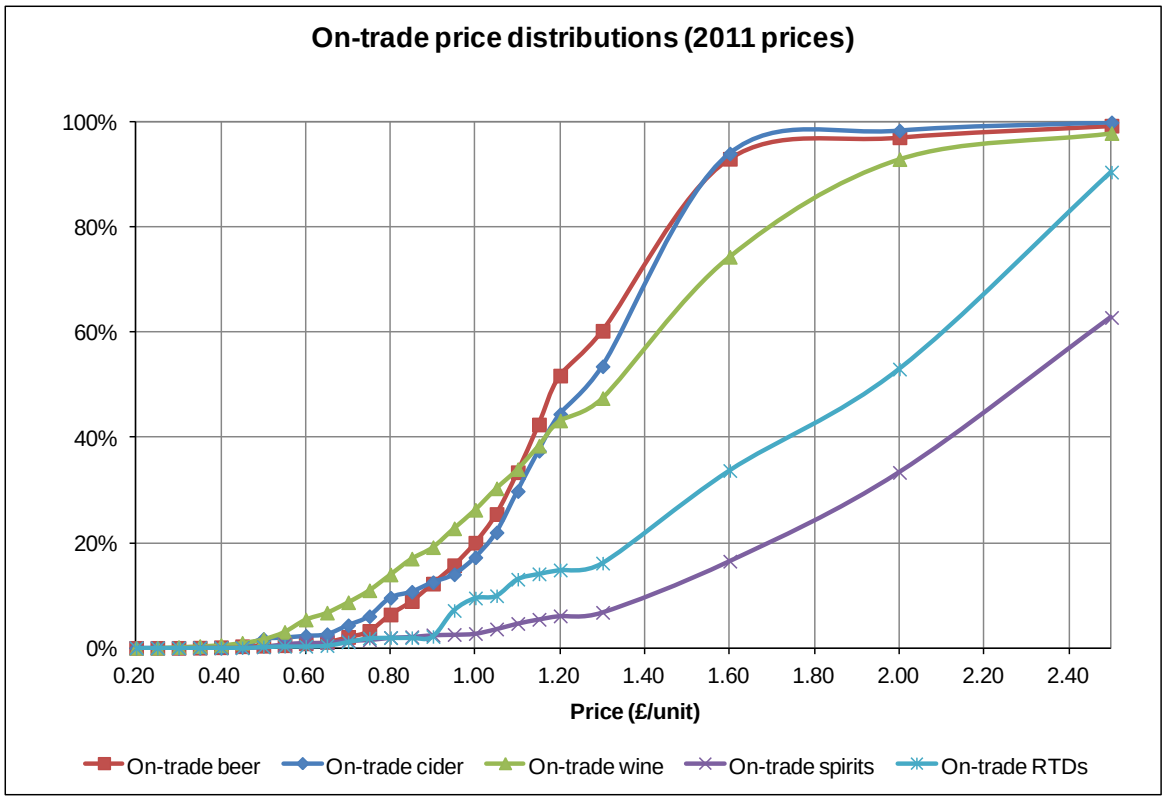

Figure 3-5: Final on-trade price distributions for beer/cider, wine, spirits and RTDs in 2011 prices

Table 3.3: Proportions of alcohol sold below a range of MUP thresholds

	Proportions sold below thresholds (2014/15 prices)		
	40p	45p	50p
Off-trade beer	29.4%	44.8%	59.5%
Off-trade cider	59.8%	70.2%	77.3%
Off-trade wine	10.7%	24.9%	41.2%
Off-trade spirits	13.1%	38.5%	59.8%
Off-trade RTDs	0.2%	0.8%	1.6%
On-trade beer	0.0%	0.2%	0.4%
On-trade cider	0.0%	0.0%	0.3%
On-trade wine	0.4%	0.6%	1.2%
On-trade spirits	0.1%	0.1%	0.1%
On-trade RTDs	0.0%	0.0%	0.1%

Although SAPM works on subgroup-specific price distributions, the figures and table provide approximations of the overall proportion of alcohol within each category that would be directly affected by MUP policies. It is apparent that these policies have a minimal impact on on-trade prices and mainly target off-trade prices; especially prices for off-trade cider, beer and spirits. For example, a 45p MUP defined in 2014/15 prices would affect around 70.2% of cider sales, 44.8% of beer, 38.5% of spirits, 24.9% of wine and 0.8% of RTDs in the off-trade and <0.6% of on-trade sales.

In SAPM2.5, apart from gender, age group and drinker group, individuals in the LCF/EFS are categorised as low income (below 60% of median equivalised household income) or higher income bracket (above this threshold) to construct subgroup-specific price distributions. The threshold used is the standard definition of relative poverty in the UK and this definition uses equivalised household income to account for differences in levels of disposable income based on household composition. Table 3.4 shows the proportions of individuals categorised as low income in each LCF/EFS survey based on the equivalised household income variables recorded in these surveys.

Table 3.4: Proportions of LCF/EFS individuals categorised as low income

Year	Low income (%)
2001	23.5%
2002	23.3%
2003	19.6%
2004	19.2%
2005	19.7%
2006	22.0%
2007	21.5%
2008	19.8%
2009	20.1%
Total	21.5%

Table 3.5 compares the average price per unit paid and the proportions of alcohol sold below 45p per unit for 10 modelled beverage types and for low and higher income drinkers. It shows that low income drinkers pay around 14.9% (ranging from 5.1% to 17.1%) less than higher income drinkers per unit of alcohol. Compared to higher income drinkers, low income drinkers have higher proportions of alcohol sold below modelled MUP thresholds for most beverage types. For example, while 44.8% of off-trade beer sold is below 45p per unit for the England population (see Table 3.3), the proportions are 50.1% and 43.1% for low- and higher income drinkers respectively (Table 3.5). For all alcohol sold (off- and on-trade), the proportions sold below a 45p MUP threshold are 31.5% and 20.9% for low- and higher

income drinkers. The data indicates that low income drinkers will be more affected by MUP polices than higher income drinkers.

Table 3.5: Comparison of average price paid and proportions of alcohol sold below 45p per unit between two income groups

	Average price paid in pence per unit (2011 prices)			Proportion of purchases below 45p per unit (2014/15 prices)	
	Low income	Higher income	% difference	Low income	Higher income
Off-trade beer	42.9	45.2	5.1%	50.1%	43.1%
Off-trade cider	33.6	39.9	15.9%	78.3%	66.2%
Off-trade wine	47.8	55.3	13.5%	36.6%	22.4%
Off-trade spirits	46.0	49.9	7.8%	43.9%	36.3%
Off-trade RTDs	74.0	78.4	5.6%	0.7%	0.8%
On-trade beer	113.3	126.6	10.5%	0.2%	0.1%
On-trade cider	103.2	124.4	17.1%	0.0%	0.0%
On-trade wine	116.1	139.5	16.8%	1.6%	0.5%
On-trade spirits	221.3	248.7	11.0%	0.1%	0.1%
On-trade RTDs	164.8	184.9	10.9%	0.0%	0.0%
Total	73.1	85.9	14.9%	31.5%	20.9%

Table 3.6 compares the average price per unit paid and the proportions of alcohol sold below 45p per unit for 10 modelled beverage types and for moderate, hazardous and harmful drinkers. It shows that harmful drinkers pay around 23.1% less than moderate drinkers per unit of alcohol (range from 1.4% to 27.3%). Compared to moderate drinkers, hazardous and harmful drinkers have higher proportions of alcohol sold below modelled MUP thresholds. For example, while 44.8% of off-trade beer sold is below 45p per unit for the England population (Table 3.3), the proportions purchased below this threshold are 28.3%, 42.3% and 53.5% for moderate, hazardous and harmful drinkers respectively (Table 3.6). For all alcohol sold (off- and on-trade), the proportions sold below a 45p MUP threshold are 12.5%, 19.5% and 30.5% for moderate, hazardous and harmful drinkers. The data indicates that hazardous and harmful drinkers will be more affected by MUP policies than moderate drinkers.

Table 3.6: Comparison of average price paid and proportions of alcohol sold below 45p per unit by moderate, hazardous and harmful drinkers (pence per unit)

	Average price paid in pence per unit (2011 prices)				Proportion of purchases below 45p per unit (2014/15 prices)		
	Moderate	Hazardous	Harmful	% (moderate vs. harmful)	Moderate	Hazardous	Harmful
Off-trade beer	49.2	45.1	41.5	15.7%	28.3%	42.3%	53.5%
Off-trade cider	45.0	39.5	33.6	25.5%	54.2%	64.8%	77.4%
Off-trade wine	56.2	53.8	52.9	5.9%	21.0%	21.3%	27.9%
Off-trade spirits	52.3	48.3	46.1	11.9%	30.0%	34.0%	41.9%
Off-trade RTDs	95.3	81.0	69.3	27.3%	0.6%	0.6%	1.2%
On-trade beer	130.7	122.8	118.3	9.5%	0.0%	0.2%	0.2%
On-trade cider	126.2	120.9	114.1	9.5%	0.0%	0.0%	0.0%
On-trade wine	139.0	134.8	137.0	1.4%	0.6%	0.4%	1.0%
On-trade spirits	254.6	236.4	222.0	12.8%	0.0%	0.2%	0.0%
On-trade RTDs	189.9	177.7	176.5	7.1%	0.0%	0.0%	0.0%
Total	96.8	80.5	74.4	23.1%	12.5%	19.5%	30.5%

3.3.3 Price elasticities of alcohol demand

A new econometric model has been developed to estimate price elasticities of demand for alcohol. The key motivations for developing this model are: 1) estimating the price elasticity of cider separately to beer, 2) taking advantage of a longer period of the LCF/EFS data, 3) addressing limitations arising from the cross-sectional nature of the LCF/EFS, and 4) addressing limitations arising from the two-week data collection period in the LCS/EFS and the significant numbers of zero purchases this produces in the dataset.

Details of the econometric model that has been used in SAPM2.5 have been described elsewhere (see http://www.sheffield.ac.uk/scharr/sections/heds/discussion-papers/1313-1.283506). The paper describes the rationale, method, data, results and limitations of the econometric analysis; and it forms an essential accompaniment to this report. Table 3.7 summaries the key result of the econometric analysis as a 10x10 elasticity matrix, with values on the diagonal representing own-price elasticities and remaining values representing cross-price elasticities. Elasticities are available for 10 categories of beverage – beer, cider, wine, spirits, and RTDs, split by off-trade (e.g. supermarkets) and on-trade (e.g. pubs). For example, the estimated own-price elasticity for off-trade beer is -0.98, indicating the demand for off-trade beer is estimated to be reduced by 9.8% when the price of off-trade beer is increased by 10%, all other things being equal. The estimated cross-price elasticity of demand for on-trade wine with regard to off-trade beer price is 0.25, indicating the demand for on-trade wine increases by 2.5% when the price for off-trade beer is increased by 10% (i.e. a substitution effect).

Table 3.7: Estimated own- and cross-price elasticities for off- and on-trade beer, cider, wine, spirits and RTDs in the UK

		Purchase									
		Off-beer	Off-cider	Off-wine	Off-spirits	Off-RTDs	On-beer	On-cider	On-wine	On-spirits	On-RTDs
Price	Off-beer	-0.980*	-0.189	0.096	-0.368	-1.092	-0.016	-0.050	0.253	0.030	0.503
	Off-cider	0.065	-1.268*	0.118	-0.122	-0.239	-0.053	0.093	0.067	-0.108	-0.194
	Off-wine	-0.040	0.736*	-0.384*	0.363	0.039	-0.245	-0.155	0.043	-0.186	0.110
	Off-spirits	0.113	-0.024	0.163	-0.082	-0.042	0.167	0.406	0.005	0.084	0.233
	Off-RTDs	-0.047	-0.159	-0.006	0.079	-0.585*	-0.061	0.067	0.068	-0.179*	0.093
	On-beer	0.148	-0.285	0.115	-0.028	0.803	-0.786*	0.867	1.042*	1.169*	-0.117
	On-cider	-0.100	0.071	0.043	0.021	0.365	0.035	-0.591*	0.072	0.237*	0.241
	On-wine	-0.197	0.094	-0.154	-0.031	-0.093	-0.276	-0.031	-0.871*	-0.021	-0.363
	On-spirits	0.019	-0.117	-0.027	-0.280	-0.145	-0.002	-0.284	0.109	-0.890*	0.809*
	On-RTDs	0.079	0.005	-0.085	-0.047	0.369	0.121	-0.394	-0.027	-0.071	-0.187

Remarks *: p-value <0.05

3.3.4 Price to consumption model

Data from the GLF 2009 were used to provide the baseline data for alcohol consumption in England. The main mechanism of the model is that a change in price modifies the consumption patterns derived from the GLF. Within the model, a new GLF is simulated for each modelled year based on the estimated impact of the policy which is being appraised. However, the GLF does not provide information about on- and off-trade consumption which is a critical additional component required to model the impact of policies with differential impacts for on- and off-trade prices. Thus the baseline GLF needs to be augmented using the LCF so that the 'on' versus 'off trade' distinction can be properly accommodated in the model.

The price to consumption model is therefore composed of three major steps (Figure 3.6):

1. The LCF is used to derive a new GLF containing consumption estimates for 10 beverage types; off- and on-trade beer, cider, wine, spirits, RTDs.
2. The LCF is interpolated using Nielsen and CGA data (described in Section 3.3.2).
3. The model is then used to estimate the impact of a proposed policy change in terms of change in consumption.

Step 1 was carried out by combining the consumption distribution from the GLF with the LCF purchasing distribution to produce a "new GLF" for the 10 elements of the matrices [2].

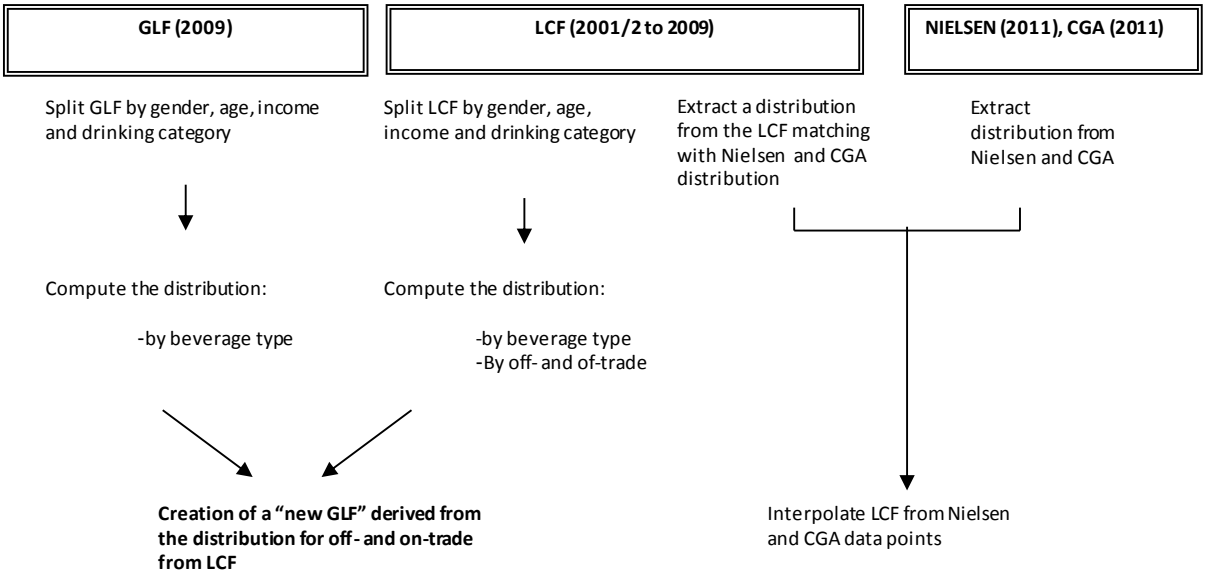

Figure 3-6: Model construction steps: creation of a new GLF and new LCF-Nielsen-CGA dataset

Finally, in step 3, after a "new GLF" has been created, the impact of a price policy on mean weekly consumption was examined for each modelled subgroup using the elasticity matrix described in Table 3.7. The formula used to apply the elasticity matrix is shown below:

$$\%\Delta C_i = \ 1 + e_{ii}\%\Delta p_i \ (1 + \ \sum_{j \neq i}^{\forall j} e_{ij}\%\Delta p_j) - 1 \qquad \textit{Equation 1}$$

where $\%\Delta C$ is the estimated percentage change in consumption for beverage *I*, e_{ii} is the own-price elasticity for beverage *I*, $\%\Delta p_i$ is the percentage change in price for beverage *I*, e_{ij} is the cross-price elasticities for the consumption of beverage *i* due to a change in the price of beverage *j* and $\%\Delta p_j$ is the percentage change in price for beverage *j*.

As described in Section 3.3.1, the estimated relative change in weekly consumption for each subgroup is then used to predict the relative change in peak daily consumption for that subgroup.

3.4 MODELLING THE RELATIONSHIP BETWEEN CONSUMPTION AND HARM

3.4.1 Model structure

An epidemiological approach is used to model the relationship between consumption and harm, relating changes in the prevalence of alcohol consumption to changes in prevalence of risk of experiencing harmful outcomes. Risk functions relating consumption (however described), to level of risk are the fundamental components of the model.

The 'consumption to harm' model considers the impact of consumption on harms in three domains: health (including the impact on both mortality and morbidity), crime and the workplace. The high-level conceptual framework is shown in Figure 3.1.

3.4.2 Alcohol-attributable fractions and potential impact fractions

The methodology is similar to that used in Gunning-Scheper's Prevent model [12], being based on the notion of the alcohol-attributable fraction (AAF) and its more general form, the potential impact fraction (PIF).

The AAF of a disease can be defined as the difference between the overall average risk (or incidence rate) of the disease in the entire population (drinkers and never-drinkers) and the average risk in those without the exposure factor under investigation (never-drinkers), expressed as a fraction of the overall average risk. For example, the AAF for female breast cancer is simply the risk of breast cancer in the total female population minus the risk of breast cancer in women who have never drank alcohol, divided by the breast cancer risk for

the total female population. Thus, AAFs are used as a measure of the proportion of the disease that is attributable to alcohol. While this approach has traditionally been used for chronic health-related outcomes, it can in principle be applied to other harms (including those outside of the health domain).

The AAF can be calculated using the following formula:

$$AF = \frac{\sum_{i=1}^{n} p_i \left(RR_i - 1\right)}{1 + \sum_{i=1}^{n} p_i \left(RR_i - 1\right)}$$

Equation 2

where *RRi* is the relative risk (RR) of exposure to alcohol at consumption state *i*, *pi* is the proportion of the population exposed to alcohol at consumption state *i* and *n* is the number of consumption states.

If the reference category is 'abstention from alcohol' then the AAF describes the proportion of outcomes that would not have occurred if everyone in the population had abstained from drinking. Thus the numerator is essentially the excess expected cases due to alcohol exposure and the denominator is the total expected cases. In situations where certain levels of alcohol consumption reduce the risk of an outcome (e.g. coronary heart disease) the AAF can be negative and would describe the additional cases that would have occurred if everyone was an abstainer.

Note that there are methodological difficulties with AAF studies. One problem is in defining the non-exposed group – in one sense 'never drinkers' are the only correct non-exposed group, but they are rare and usually quite different from the general population in various respects. However, current non-drinkers include those who were heavy drinkers in the past (and these remain a high-risk group, especially if they have given up due to alcohol-related health problems). Several recent studies show that findings of avoided coronary heart disease risk may be based on systematic errors in the way abstainers were defined in the underlying studies [13].

The PIF is a generalisation of the AAF based on arbitrary changes to the prevalence of alcohol consumption (rather than assuming all drinkers become abstainers). Note that a lag may exist between the exposure to alcohol and the resulting change in risk. The PIF can be calculated using the following formula:

$$PIF = 1 - \frac{\sum_{i=0}^{n} \overline{p_i} RR_i}{\sum_{i=0}^{n} p_i RR_i}$$

Equation 3

where $\overline{p_i}$ is the modified prevalence for consumption state *i* and state 0 corresponds to abstention.

In the model, alcohol consumption in a population subgroup is described non-parametrically by the associated observations from the GLF. For any harmful outcome, risk levels are associated with consumption level for each of the observations (note that these are not person-level risk functions). The associated prevalence for the observation is simply defined by its sample weight from the survey. Therefore, the PIF is implemented in the model as:

$$PIF = 1 - \frac{\sum_{i=0}^{N} w_i \overline{RR_i}}{\sum_{i=0}^{N} w_i RR_i} \qquad \textit{Equation 4}$$

where w_i is the weight for observation *i*, $\overline{RR_i}$ is the modified risk for the new consumption level and *N* is the number of samples.

3.4.3 Derivation of risk functions

The impact of a change in consumption on harm was examined using three categories of risk functions:

1. Relative risk functions already available in the published literature.
2. Relative risk functions derived from the AAF for partially attributable harms.
3. Absolute risk functions for wholly attributable harms.

3.4.3.1 Risk functions already available in the published literature

The risk functions for chronic conditions that are partially attributable to alcohol are taken from the published literature (see Appendix 4 in the original SAPM2 report [2]).

3.4.3.2 Relative risk functions derived from the AAF for partially attributable harms

For some types of harms, such as crime and acute health harms, evidence is available for the AAF but not risk functions. The AAF evidence can be used to derive a relative risk function assuming the relationship described in Equation 2 since the AAF is a positive function of the prevalence of drinking and the relative risk function.

Two assumptions are necessary to compute a relative function from an AAF: assumptions about the form of the curve (or risk function) and assumptions about the threshold below which the relative risk is unity (i.e., harm is not associated with alcohol). Linear functions were selected for the present analyses due to the lack of data in the literature.

The consequences of alcohol consumption tend to be distinguished in terms of those due to average drinking levels (chronic harms) and those due to levels of intoxication (acute harms). Different thresholds were thus used according to the link between harms and drinking pattern:

- For chronic harms – the risk was assumed to start from 3 units per day for males and 2 units per day for females. These thresholds were derived from the NHS recommendations for moderate drinking, (i.e. drinking less than 21 units per week for males and 14 units per week for females). Risk was not assumed to start from zero units, since it was thought inappropriate to assume that populations drinking below the NHS limits would be at increased risk of chronic conditions such as alcoholic liver disease.
- For acute harms – a threshold relating to the NHS definition of bingeing (more than 8 and 6 units for males and females respectively) and a threshold of zero were both considered for use in the model. It is important to note that the available GLF data relates to peak consumption on the heaviest drinking day in the previous 7 days and is therefore only a proxy measure for patterns of drinking to intoxication. It does not measure frequency or variation in binge drinking behaviour. 8/6 units was not selected as the threshold since it was considered that a peak measurement of, for example, 7 units in a male respondent would constitute some evidence for drinking to intoxication over the course of a year. Zero units was not selected since it was also considered that a peak measurement of, for example, 1 unit was insufficient evidence of drinking to intoxication. Therefore a threshold of 4/3 units was chosen as a compromise solution since this corresponds to the mid-way point of the bingeing definition.

The resulting relative risk functions are therefore a function of consumption (for which a slope is defined) and threshold as follows:

$$RR\ c\ = 1\ if\ c < T$$

$$RR\ c\ = \beta\ \ c - T\ \ + 1\ \ otherwise \qquad \textit{Equation 5}$$

where c = mean consumption level, T = threshold and β=slope parameter.

An example of a linear function constructed from an AAF is shown in Figure 3.7.

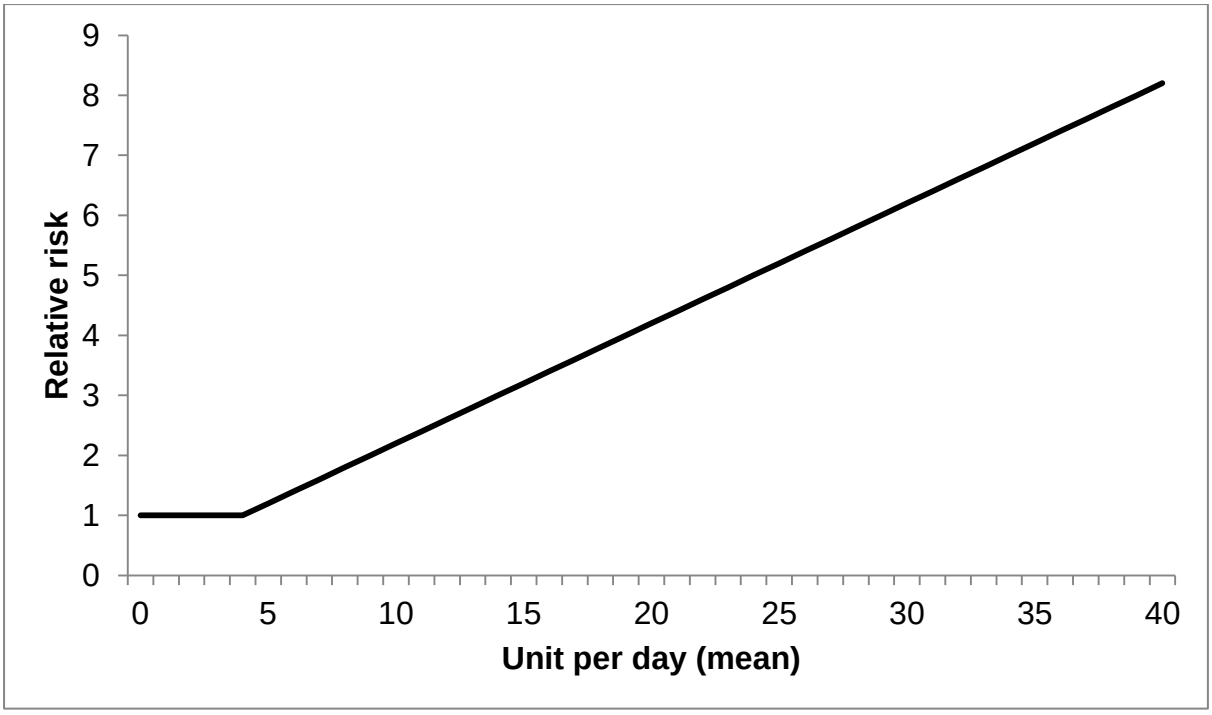

Figure 3-7: Illustrative linear relative risk function for a partially attributable chronic harm (threshold of 4 units)

3.4.3.3 Absolute risk functions for wholly attributable harms

While it was possible to estimate relative risk functions for most harms, it was impossible to derive such functions for wholly attributable harms (with an AAF of 100%) due to the absence of a reference group.

An alternative approach was thus adopted: absolute risk functions were calculated based on the number of harm events, the drinking prevalence, and the total population. As for relative risk functions, assumptions were necessary about the curve form and the starting threshold. The same assumptions as for relative risks were used for consistency.

The resulting relative risk function is therefore a function of consumption (for which a slope is defined) and threshold as follows:

$$AR\ c\ = 0\ if\ c < T$$

$$AR\ c\ = \beta\ \ c - T\quad otherwise \qquad \textit{Equation 6}$$

where AR = absolute risk, *c* = peak consumption level, *T* = threshold and *β*=slope parameter.

An example of a linear absolute risk function constructed from the number of deaths is presented in Figure 3.8. When using real data, the units on the vertical axis would be deaths or hospitalisations depending on the component of the model. The key difference of the

absolute risk function compared to RR function is that the absolute risk equals 0, rather than 1, when the peak day intake is below the threshold.

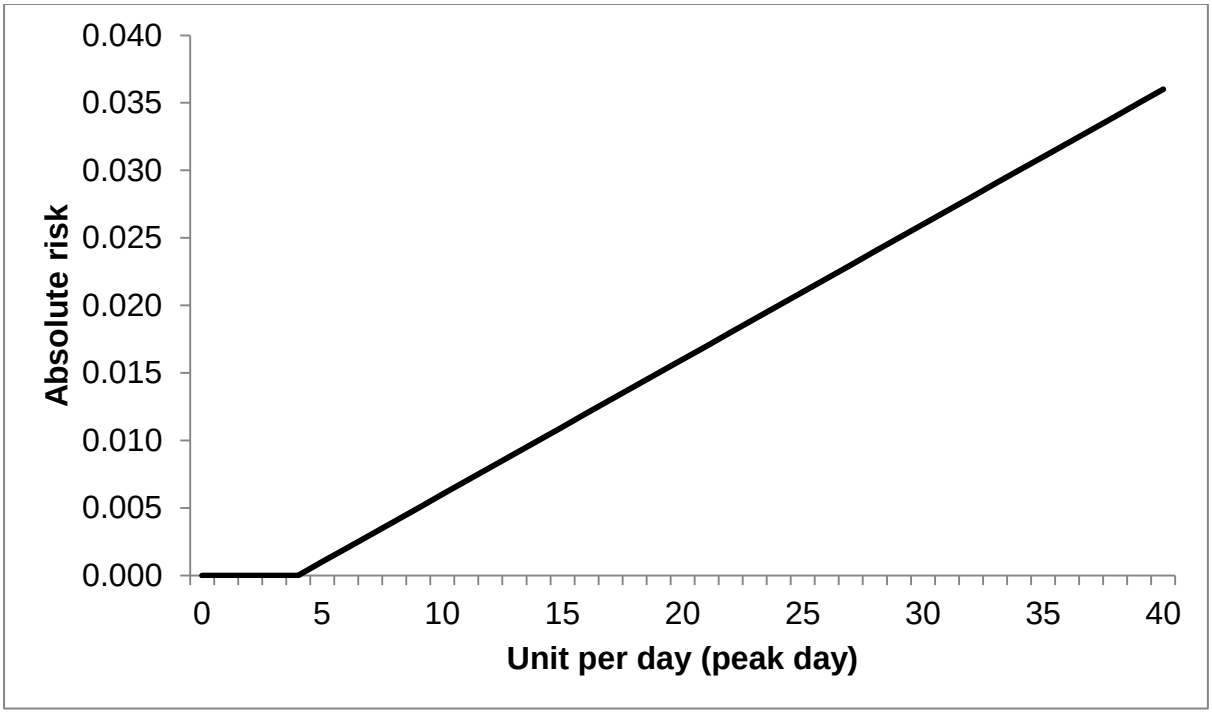

Figure 3-8: Illustrative linear absolute risk function for a wholly attributable chronic harm (threshold of 4 units)

3.5 CONSUMPTION TO HEALTH HARMS MODEL

3.5.1 Changes in SAPM2.5 model

Risk functions describe the relationship between different levels of consumption and the risks of experiencing a given outcome. For partially attributable chronic conditions, the risk functions from the literature continue to be used [2]. Risk functions for all acute and wholly attributable chronic conditions have been re-estimated for SAPM2.5 using the GLF 2009 to derive age/gender specific distributions of average weekly and peak day alcohol consumption using the methods above. The new parameter estimates for risk functions are provided in Appendix 3. The baseline population used for the life table, which is used to model transitions between live and death and prevalence of alcohol-related harms, has also been updated using the latest England population statistics in 2010 from the ONS which is the latest available age-specific population survey in England.[14]

For wholly attributable chronic and acute conditions, the method for estimating the annual absolute risk function has been revised. Originally, two parameters were estimated for each absolute risk function, a constant and a slope. An absolute risk of 0 was assumed when

peak day consumption is below consumption thresholds adapted from NHS consumption guidelines (4 units for males and 3 units for females). The absolute risk for a given level of consumption is determined by the constant parameter at the threshold levels and the fixed rate of increase in risk given by the slope parameter. In this analysis, the previously estimated constant is fixed at value 0 and only a slope is estimated to avoid a sudden change in risk from 0 to a positive absolute risk when consumption levels pass through the thresholds given above (see Section 3.4.3 for details).

Baseline levels of mortality and morbidity have not been updated and previous model inputs were used [2]. The costs of hospital admissions were adjusted to 2011 prices using annual RPIs from the ONS.

3.5.2 Summary of methods unchanged since SAPM2

3.5.2.1 Health model structure

The model aims to capture policy impacts for the large number of health conditions for which evidence suggests alcohol plays a contributory role. The actual set of conditions used is taken from The North West Public Health Observatory's (NWPHO) 2008 report on alcohol-attributable mortality and hospital admissions in England [15]. Foetal alcohol syndrome and other health conditions relating to the secondary consequential impact of alcohol on the unborn foetus were not included in the model.

NWPHO classified harms into four categories of attribution:

1. Wholly attributable (AAF=100%) chronic – meaning that the harm cannot occur in the absence of alcohol consumption, and risk of occurrence changes with chronic exposure to alcohol (e.g. alcoholic liver disease, ICD10 code = K70)
2. Wholly attributable acute – meaning that the harm cannot occur without alcohol as its cause, and risk of occurrence changes with acute exposure to alcohol including intoxication (e.g. accidental poisoning by and exposure to alcohol, ICD10 code = X45)
3. Partially attributable chronic – meaning that the harm can occur without alcohol but the risk of occurrence changes with chronic exposure to alcohol (e.g. malignant neoplasm (cancer) of the oesophagus, ICD10 code = C15)
4. Partially attributable acute – meaning that the harm can occur without alcohol but the risk of occurrence changes with acute exposure to alcohol (e.g. falls, ICD10 code = W00-W19, or assault, ICD10 = X85-Y09).

The same set of conditions is assessed in the modelling, with one exception: heart failure was excluded from the analysis due to the very small AAF reported in the NWPHO study. The list of 47 conditions is presented in Table 3.8.

Table 3.8: Health conditions included in the model

	Condition	*ICD-10 code*	*Con. type*	*Source of AAF or risk function*
Wholly attributable chronic conditions	Alcohol-induced pseudo-Cushing's syndrome	E24.4	Mean	100% attributable
	Degeneration of the nervous system	G31.2	Mean	
	Alcoholic polyneuropathy	G62.1	Mean	
	Alcoholic myopathy	G72.1	Mean	
	Alcoholic cardiomyopathy	I42.6	Mean	
	Alcoholic gastritis	K29.2	Mean	
	Alcoholic liver disease	K70	Mean	
	Chronic pancreatitis	K86.0	Mean	
Wholly attr. acute conditions	Mental and behavioural disorders due to use of alc.	F10	Peak	100% attributable
	Ethanol poisoning	T51.0	Peak	
	Methanol poisoning	T51.1	Peak	
	Toxic effect of alcohol, unspecified	T51.9	Peak	
	Accidental poisoning by exposure to alcohol	X45	Peak	
Partially attributable chronic conditions	Malignant neoplasm of lip, oral cavity and pharynx	C00-C14	Mean	[16]
	Malignant neoplasm of oesophagus	C15	Mean	
	Malignant neoplasm of colon	C18	Mean	
	Malignant neoplasm of rectum	C20	Mean	
	Malig. neoplasm of liver and intrahepatic bile ducts	C22	Mean	
	Malignant neoplasm of larynx	C32	Mean	
	Malignant neoplasm of breast	C50	Mean	[17]
	Diabetes mellitus (type II)	E11	Mean	[18]
	Epilepsy and status epilepticus	G40-G41	Mean	[19]
	Hypertensive diseases	I10-I15	Mean	[16]
	Ischaemic heart disease	I20-I25	Mean	[20]
	Cardiac arrhythmias	I47-I48	Mean	[18]
	Haemorrhagic stroke	I60-I62, I69.0-I69.2	Mean	[16]
	Ischaemic stroke	I66-I66,I69.3, I69.4	Mean	
	Oesophageal varices	I85	Mean	
	Gastro-oesophageal laceration-haemorrhage synd.	K22.6	Mean	[21]
	Unspecified liver disease	K73, K74	Mean	[16]
	Cholelithiasis	K80	Mean	[18]
	Acute and chronic pancreatitis	K85, K86.1	Mean	[16]
	Psoriasis	L40 excludes L40.5	Mean	[18]
	Spontaneous abortion	O03	Mean	
Partially attributable acute conditions	Road traffic accidents - non pedestrian	V (various)	Peak	[22]
	Pedestrian traffic accidents	V (various)	Peak	
	Water transport accidents	V90-V94	Peak	[21]
	Air/space transport accidents	V95-V97	Peak	
	Fall injuries	W00-W19	Peak	[22]
	Work/machine injuries	W24-W31	Peak	[21]

	Condition	*ICD-10 code*	*Con. type*	*Source of AAF or risk function*
	Firearm injuries	W32-W34	Peak	[21]
	Drowning	W65-W74	Peak	[21]
	Inhalation of gastric contents	W78	Peak	[21]
	Fire injuries	X00-X09	Peak	
	Accidental excessive cold	X31	Peak	
	Intentional self-harm	X60-X84	Peak	[21]
	Assault	X85-Y09	Peak	[21]

3.5.2.2 Mortality model structure

A simplified version of the model structure for mortality is presented in Figure 3.9. The model is developed to represent the population of England in a life table. Separate life tables have been implemented for males and females.

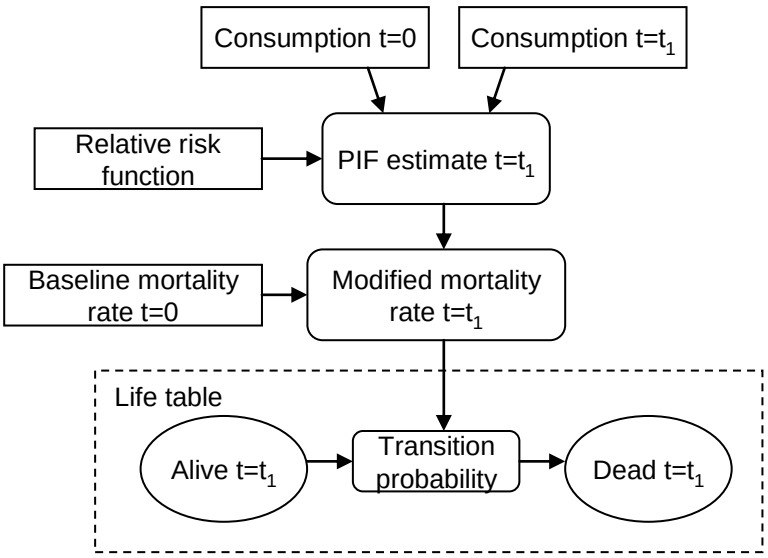

Figure 3-9: Simplified mortality model structure

The life table is implemented as a linked set of simple Markov models with individuals of age *a* transitioning between two states – alive and dead – at model time step *t*. Those of age *a* still alive after the transition then form the initial population for age *a+1* at time *t+1* and the sequence repeats.

The transition probabilities from the alive to dead state are broken down by condition and are individually modified via potential impact fractions over time *t*, where the PIF essentially varies with consumption (mean for chronic conditions and maximum daily for acute conditions) over time:

$$PIF_t = \frac{\sum_{i=1}^{N} r_{i,t} w_i}{\sum_{i=1}^{N} r_{i,0} w_i} \qquad \textit{Equation 7}$$

where PIF_t is the potential impact fraction relating to consumption at time t, i = GLF sample number, N = number of samples in subgroup i, $r_{i,t}$ is the risk relating to the consumption of GLF sample i at time t, $r_{i,0}$ is the risk at baseline, and w_i is the weight of sample i.

Note that the PIF can be decomposed to enable different population groups at baseline – for example, moderate, hazardous and harmful drinkers – to be followed separately over the course of the model.

The model computes mortality results for two separate scenarios (a baseline – implemented as 'no change to consumption' in the analysis herein – and an intervention). The effect of the intervention is then calculated as the difference between the life tables of two scenarios: enabling the change in the total expected deaths attributable to alcohol due to the policy to be estimated.

Outcomes from the mortality modelling are expressed in terms of life years saved. Morbidity valuation is the purpose of a second model described below.

3.5.2.3 Morbidity model structure

A simplified schematic of the morbidity model is shown in Figure 3.10. The model focuses on the expected disease prevalence for population cohorts and as such is quite simple. Note that if an incidence-based approach were used instead, then much more detailed modelling of survival time, cure rates, death rates and possibly disease progression for each disease for each population subgroup would be needed.

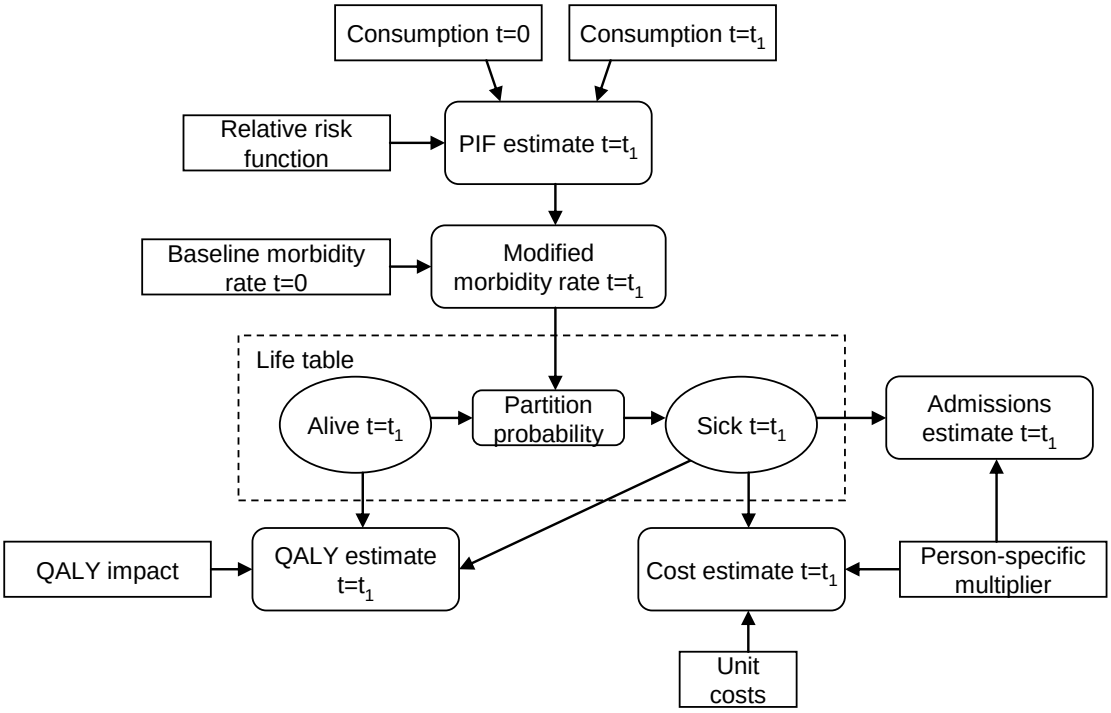

Figure 3-10: Simplified structure of morbidity model

The morbidity model works by partitioning the alive population at time *t*, rather than using a transition approach between states as previously described for the mortality model. Alive individuals are partitioned between all 47 alcohol-related conditions (and a 48th condition representing overall population health, not attributable to alcohol) derived using person-specific disease prevalence rates calculated from the NWPHO work.

As in the mortality model, the PIF is calculated based on the consumption distribution at time *0* and *t* and risk functions. The PIF is then used to modify the partition rate (i.e., the distribution of the 47 conditions for alive individuals) to produce person-specific sickness volumes. These volumes then form the basis for estimating both health service costs and health-related quality of life.

Quality Adjusted Life Years (QALYs) are examined using the difference in health-related quality of life (utility) in individuals with alcohol health harms and the quality of life measured in the general population (or "normal health"). Utility scores usually range between 1 (perfect health) and 0 (a state equivalent to death), though it is possible for some extreme conditions to be valued as worse than death. The utility scores are an expression of societal preference for health states with several different methods available to estimate them. Note that because a life table approach has been adopted, the method to estimate QALY change for morbidity also encompasses the mortality valuation.

3.5.2.4 Time lag effects for chronic harms

When modelling the link between consumption and harm, one important input is the assumption surrounding the 'time lag' – the time needed to achieve the full benefit (reduction in harms) associated with a reduction of consumption. Such data is necessary for chronic conditions where the development of disease often occurs over many years.

A mean lag of 10 years was assumed for all chronic conditions. While such a lag may under- or over-estimate the true mean time lag for some conditions, given the lack of consensus it is considered to be a plausible estimate. The time lag for acute conditions was assumed to be zero since benefits associated with a reduction of acute harms occur instantaneously [23]. One potential limitation is the assumption that the time lag is similar for both morbidity and mortality which is unlikely to be true for many conditions. However in the absence of data and consensus, such an assumption had to be made.

The time lag effect was considered in our model assuming a linear progression. This is supported by Norström and Skog, who fitted a geometric function with λ=0.8 to estimate the effect of the lag, which is very close to a linear effect.

Thus, for a 10 year time lag, benefits associated with a reduction in consumption at year 1 will be associated with one tenth of the expected full benefits. One tenth of full benefits will be achieved each year up to year 10. An illustration is shown in Figure 3.11.

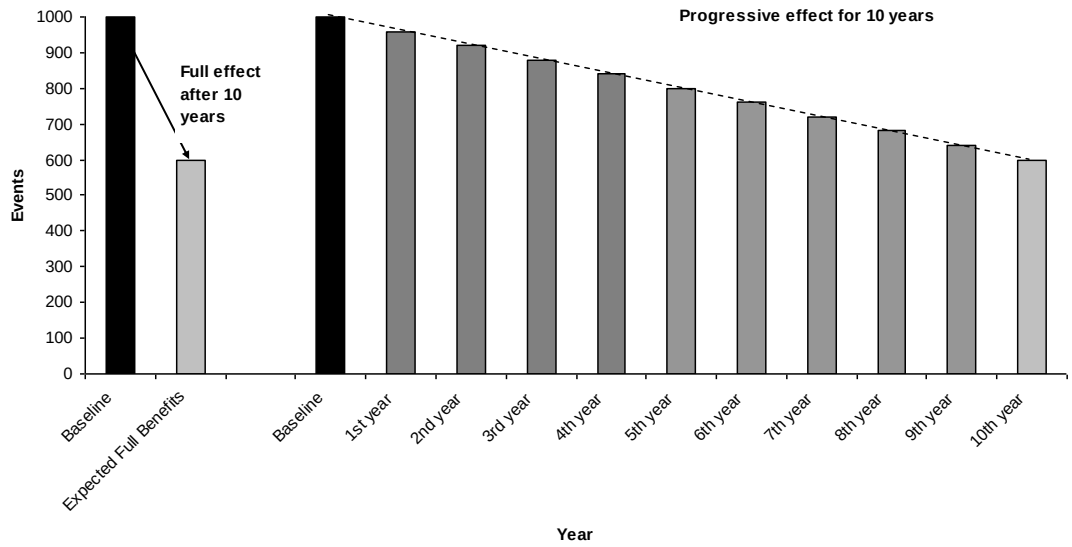

Figure 3-11: Illustrative example of the time lag effect for chronic conditions

3.6 CRIME HARMS

3.6.1 Changes in SAPM2.5 model

Baseline levels of crime volumes have been updated using the latest police recorded crime data for England and Wales [24] and the latest estimates of crime multipliers which account for under-reporting of crimes within the recorded crime data [25] (see Table 3.9). The costs of crime were also updated using the latest estimates [25] (see Table 3.9). One change to the methodology for calculating costs of crime is that the loss of QALYs for crime victims is now embedded within the total cost of crime and not calculated separately. England-specific crime volume data was not available at the level of modelled crime categories and therefore was estimated by apportioning England and Wales total crime volumes using high level crime volume information for England and Wales.

Table 3.9: Updated number of crime volumes and costs in England

Crime categories	Recorded volumes	Multipliers	Total volumes	Costs (£)
Causing death by dangerous driving under the influence, driving after having consumed excess alcohol	23	1.0	23	1,774,681
More serious wounding	17,260	1.5	25,889	25,747
Less serious wounding	299,072	1.5	448,608	9,790
Assault on a constable	14,777	7.9	116,738	1,750
Assault without injury	191,082	7.9	1,509,544	1,750
Criminal damage	589,136	5.9	3,475,905	1,053
Theft from the person	93,746	4.6	431,232	763
Robbery	66,556	4.8	319,468	8,810
Robbery (Business)	6,634	4.8	31,844	9,372
Burglary in a dwelling	233,771	2.8	654,558	3,925
Burglary not in a dwelling	243,701	1.9	463,033	4,608
Theft of a pedal cycle	108,018	3.6	388,866	763
Theft from vehicle	285,367	3.5	998,784	1,034
Aggravated vehicle taking	5,941	1.3	7,723	4,970
Theft of vehicle	81,514	1.3	105,968	4,970
Other theft	458,124	2.7	1,236,935	763
Theft from shops	287,350	16.1	4,626,340	124
Violent disorder	648	1.5	972	12,632
Total sexual offences	50,402	13.6	685,461	36,952
Homicide	517	1.0	517	1,774,681

The risk functions for all crime categories were re-estimated using the GLF 2009 to derive age/gender-specific distributions for peak daily alcohol consumption. The new parameter estimates are provided in Appendix 4.

3.6.2 Summary of methods unchanged since SAPM2

The modelling of crime-related harms adapts original work by the Cabinet Office which has been recently updated by UK Government analysts [26]. The latest analysis examined 20 alcohol-related crimes and all of these are included in the model (see Table 3.9). Note that low-level anti-social behaviour is not currently included in the modelling.

A simplified schematic of the crime model is shown in Figure 3.12. As for the health model, the main mechanism is the PIF, which is calculated based on the consumption distribution at time *0* and time *t* and an estimated risk function. The PIF is then applied directly to the baseline number of offences to give a new volume of crime for time *t*. The model uses the consumption distribution for the intake in the heaviest drinking day in the past week (peak consumption) since crime was assumed to be a consequence of acute drinking rather than average drinking (and so there is no time delay between change in exposure to alcohol and subsequent change in risk of committing a crime).

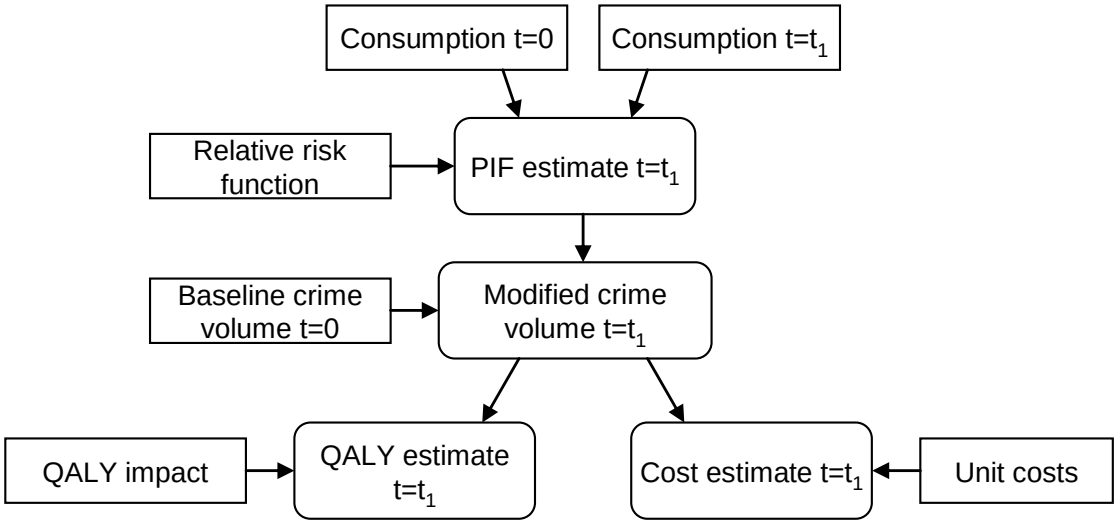

Figure 3-12: Simplified structure of crime model

Outcomes are presented in terms of the number of offences and the associated cost of crime. The outcomes from 'do nothing' and the policy scenario are then compared to estimate the incremental effect of the implementation of the policy.

3.7 WORKPLACE HARMS

3.7.1 Changes in SAPM2.5 model

The original model included two types of alcohol-related workplace harms: absenteeism and unemployment. Due to concerns regarding the robustness of the evidence detailing the relationship between unemployment and alcohol consumption, we decided to exclude unemployment from SAPM2.5. Note that the exclusion of unemployment does not mean we now believe alcohol consumption, especially at harmful levels, will not affect unemployment. Instead, following discussions with stakeholders regarding our previous reports, we have concluded that the evidence available may not be of sufficient quality to provide robust estimates of the impact of changes in alcohol consumption on rates of unemployment. Further, our previous analyses assumed full employment which may no longer tenable in the current macroeconomic climate.

For modelling absenteeism, the only change is the re-estimation of risk functions using the GLF 2009 to derive age/gender specific distributions of average and peak day alcohol consumption. The new parameters for the risk functions are shown in Appendix 5.

Baseline levels of absenteeism rates have not been updated. The costs of absenteeism were adjusted to 2011 prices using annual RPIs from the ONS.

3.7.2 Summary of methods unchanged since SAPM2

A 2003 Cabinet Office report examined three separate effects of alcohol on workplace-related issues [27]. The three components in these studies are:

- Absence from work
- Unemployment
- Lost outputs due to early death.

In SAPM2, loss of outputs due to premature mortality were excluded to avoid double-counting the social value of life years lost already estimated in the health and crime models. Unemployment is also excluded in SAPM2.5 (see Section 3.8.1).

A simplified schematic of the workplace model is shown in Figure 3.13. Based on baseline consumption, consumption at time *t* and risk functions derived above, a PIF is calculated and applied to the absence rate. Absenteeism is assumed to be related to acute drinking and so maximum daily intake is applied as the consumption measure and it is assumed that there is no time delay between change in exposure to alcohol and subsequent change in risk of absenteeism.

Using the Labour Force Survey[28], the number of days absent from work is then calculated based on the absence rate, the mean number of days worked and the number of working individuals in each age/sex subgroup. Days absent from work are then valued using individuals' daily gross income.

Outcomes for two scenarios – do nothing and policy implementation – are computed separately. The difference is then taken to estimate the incremental effect of the policy.

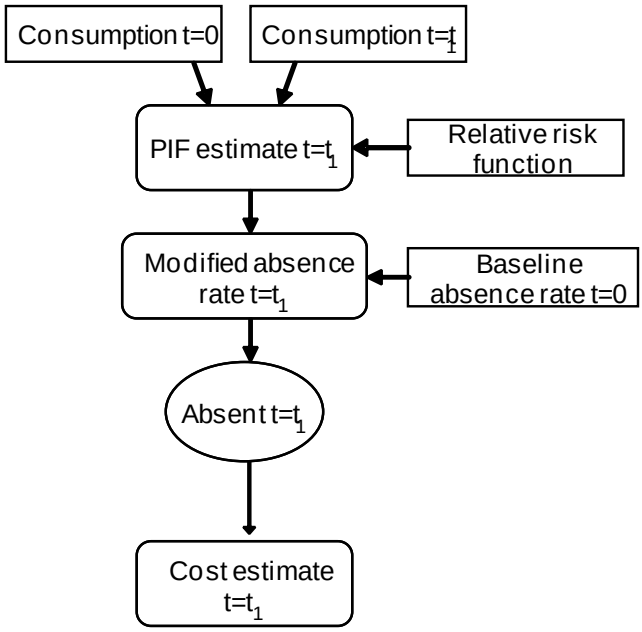

Figure 3-13: Simplified structure of workplace model

3.8 SENSITIVITY ANALYSIS

Best practice for policy modelling suggests reporting a single base case estimate, supported by a range of sensitivity analysis to reveal the effect of key uncertainties in the evidence base [29]. We have focused the sensitivity analyses on uncertainties around the elasticities estimated for the base case because elasticities are the active ingredients of MUP appraisal. These are also where the most substantial changes to the model have occurred between SAPM2 and SAPM2.5. As the elasticities are subject to both structural and parameter uncertainty, the sensitivity analyses use probabilistic sensitivity analysis (PSA) (see the previous report [2] for the details of the sampling method) and alternative price elasticity estimates. The alternative elasticity estimates tested are:

1. Assuming all cross-price elasticities to be zero (i.e. assuming no cross-price effect) in the elasticity matrix estimated for the base case (SA1);

2. Excluding non-significant elasticities (p-value greater than 0.05) in the elasticity matrix estimated for the base case (SA2);
3. Separate low income and higher income-specific elasticity matrices were estimated using the pseudo-panel approach (SA3);
4. Separate moderate and hazardous/harmful-specific elasticity matrices were estimated using the pseudo-panel approach (SA4);
5. Elasticities were estimated using a time series analysis[30] of national aggregate data on alcohol cleared for consumption or sale from 1964 to 2011 (SA5);
6. Latest elasticities estimated by Her Majesty's Revenue and Customs (HMRC) in 2012. The elasticities used for the sensitivity analyses are described in Appendix 6.

4 RESULTS

This section contains model results for a general price increase of 10% on all alcohol products in both off- and on-trade sectors and for MUPs of 40p, 45p and 50p per unit in 2014/15 prices. Results are reported for England as a whole and separately for different genders, income groups and drinker groups where appropriate[5].

4.1 SUMMARY TABLES FOR POLICIES

The impacts on consumption and consumer spending across all policies are shown for the total population and population subgroups of England in Tables 4.1 to 4.4 and Figures 4.1 to 4.3. Tables 4.5 and 4.6 show effects on revenue to the exchequer and to the retailer based on projected changes in duty and VAT charges. Harm impacts and projected cost savings from harms avoided are shown in Tables 4.7 to 4.10. For the first time, income-specific estimates of policy impact from SAPM are presented. Full income-specific estimates are presented for the effects of policies on consumption and spending. Income-specific estimates are provided for impacts on health harms; however, as in SAPM2, it is assumed that the risk functions for these harms are identical for low income and higher income population subgroups. Please note that income-specific estimates are not available for crime and workplace harms because of the structural restrictions within the C2H part of SAPM2. Longer-term work to remove these structural restrictions is on-going.

[5] As in our previous analyses, we report results for underage drinkers and for 18-24 year-old hazardous drinkers with the latter being used as a proxy for young binge drinking adults.

Table 4.1: Summary of estimated effects of pricing policies on alcohol consumption, spending and sales in England

% change in consumption per person								
	Population	Low income	Higher income	Moderate	Hazardous	Harmful	16-17	18-24 Hazardous
General price +10%	-5.0%	-6.0%	-4.7%	-4.4%	-4.7%	-5.8%	-1.1%	-4.8%
MUP 40p	-1.0%	-2.7%	-0.5%	-0.3%	-0.3%	-2.3%	-0.3%	-0.9%
MUP 45p	-1.6%	-4.3%	-0.9%	-0.6%	-0.7%	-3.7%	-0.4%	-1.5%
MUP 50p	-2.5%	-6.2%	-1.5%	-1.0%	-1.2%	-5.4%	-0.6%	-2.2%
Change in consumption per drinker per year (units)								
	Population	Low income	Higher income	Moderate	Hazardous	Harmful	16-17	18-24 Hazardous
General price +10%	-36.5	-39.9	-35.4	-12.6	-66.5	-215.1	-6.2	-69.6
MUP 40p	-7.2	-17.9	-3.8	-1.0	-4.8	-86.7	-1.5	-13.2
MUP 45p	-11.7	-28.2	-6.7	-1.6	-9.5	-136.6	-2.5	-21.4
MUP 50p	-18.2	-41.2	-11.1	-2.7	-17.3	-200.0	-3.6	-31.3
% change in spending per drinker								
	Population	Low income	Higher income	Moderate	Hazardous	Harmful	16-17	18-24 Hazardous
General price +10%	4.5%	3.2%	4.8%	5.4%	4.5%	3.4%	10.1%	6.1%
MUP 40p	0.0%	-0.6%	0.2%	0.0%	0.3%	-0.4%	0.2%	-0.6%
MUP 45p	0.4%	-0.4%	0.6%	0.3%	0.9%	-0.1%	0.4%	-0.5%
MUP 50p	1.2%	0.1%	1.4%	0.9%	1.8%	0.6%	0.7%	-0.1%
Change in spending per drinker per year (£)								
	Population	Low income	Higher income	Moderate	Hazardous	Harmful	16-17	18-24 Hazardous
General price +10%	27.44	15.53	31.10	14.77	51.39	95.35	56.47	102.22
MUP 40p	0.10	-2.76	0.98	0.05	3.35	-9.92	1.08	-9.37
MUP 45p	2.59	-1.74	3.92	0.93	9.75	-1.70	2.23	-7.83
MUP 50p	7.23	0.53	9.30	2.55	21.13	15.69	3.94	-2.42

Table 4.2: Summary of income-specific estimated effects of pricing policies on alcohol consumption, spending and sales in England

% change in consumption per person						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	-5.2%	-5.7%	-6.9%	-4.2%	-4.5%	-5.4%
MUP 40p	-0.9%	-1.7%	-4.8%	-0.2%	0.0%	-1.4%
MUP 45p	-1.5%	-2.8%	-7.5%	-0.3%	-0.2%	-2.3%
MUP 50p	-2.3%	-4.4%	-10.6%	-0.6%	-0.5%	-3.6%
Change in consumption per drinker per year (units)						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	-12.2	-81.2	-274.8	-12.7	-63.4	-195.9
MUP 40p	-2.2	-24.1	-192.5	-0.6	-0.7	-52.8
MUP 45p	-3.5	-40.0	-297.0	-1.0	-2.9	-85.2
MUP 50p	-5.5	-62.4	-419.7	-1.8	-7.6	-129.7
% change in spending per drinker						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	13.4%	3.3%	2.1%	5.6%	4.7%	3.9%
MUP 40p	-0.7%	-0.2%	-1.2%	0.1%	0.4%	-0.1%
MUP 45p	0.4%	0.3%	-1.4%	0.4%	1.0%	0.3%
MUP 50p	2.7%	1.1%	-1.5%	0.9%	2.0%	1.2%
Change in spending per drinker per year (£)						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	8.60	33.74	55.33	16.85	55.16	108.18
MUP 40p	-0.47	-2.07	-31.88	0.22	4.50	-2.89
MUP 45p	0.28	3.03	-37.42	1.15	11.18	9.75
MUP 50p	1.70	11.54	-39.91	2.84	23.18	33.50

Table 4.3: Summary of male income-specific estimated effects of pricing policies on alcohol consumption, spending and sales in England

% change in consumption per person						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	-7.1%	-7.2%	-8.0%	-6.0%	-6.1%	-6.9%
MUP 40p	-1.2%	-1.9%	-5.7%	-0.4%	-0.3%	-2.0%
MUP 45p	-1.9%	-3.2%	-8.5%	-0.6%	-0.6%	-3.2%
MUP 50p	-2.9%	-4.8%	-11.9%	-1.1%	-1.1%	-4.6%
Change in consumption per drinker per year (units)						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	-23.3	-120.5	-368.6	-23.6	-99.4	-281.2
MUP 40p	-4.0	-32.7	-260.0	-1.5	-4.9	-83.0
MUP 45p	-6.3	-53.1	-392.5	-2.5	-10.1	-128.6
MUP 50p	-9.5	-81.4	-545.2	-4.1	-18.3	-187.5
% change in spending per drinker						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	6.6%	1.5%	0.8%	3.3%	2.8%	2.1%
MUP 40p	-2.1%	-0.6%	-1.6%	-0.1%	0.2%	-0.6%
MUP 45p	-2.0%	-0.5%	-2.1%	0.0%	0.5%	-0.4%
MUP 50p	-1.0%	-0.4%	-2.6%	0.3%	1.2%	0.0%
Change in spending per drinker per year (£)						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	5.81	20.60	26.21	13.89	41.31	71.26
MUP 40p	-1.86	-8.27	-51.01	-0.57	2.68	-19.90
MUP 45p	-1.75	-7.35	-68.28	-0.04	7.79	-14.13
MUP 50p	-0.92	-4.90	-85.90	1.17	17.07	0.22

Table 4.4: Summary of female income-specific estimated effects of pricing policies on alcohol consumption, spending and sales in England

% change in consumption per person						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	-2.4%	-3.4%	-4.1%	-1.4%	-1.6%	-2.3%
MUP 40p	-0.5%	-1.3%	-2.8%	0.1%	0.4%	-0.3%
MUP 45p	-0.9%	-2.3%	-4.8%	0.2%	0.5%	-0.7%
MUP 50p	-1.5%	-3.7%	-7.3%	0.1%	0.5%	-1.5%
Change in consumption per drinker per year (units)						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	-4.0	-38.1	-122.5	-3.0	-17.6	-69.6
MUP 40p	-0.8	-14.6	-82.9	0.3	4.7	-8.0
MUP 45p	-1.4	-25.6	-141.9	0.4	6.1	-20.9
MUP 50p	-2.6	-41.5	-215.8	0.2	5.9	-43.9
% change in spending per drinker						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	23.1%	7.2%	6.2%	9.7%	9.3%	8.6%
MUP 40p	1.2%	0.7%	0.0%	0.5%	0.9%	1.2%
MUP 45p	3.8%	2.2%	0.8%	1.1%	2.0%	2.4%
MUP 50p	7.9%	4.4%	2.1%	2.2%	3.9%	4.4%
Change in spending per drinker per year (£)						
	Low income			Higher income		
	Moderate	Hazardous	Harmful	Moderate	Hazardous	Harmful
General price +10%	10.66	48.12	102.62	19.48	72.71	162.86
MUP 40p	0.55	4.71	-0.82	0.93	6.81	22.31
MUP 45p	1.78	14.40	12.71	2.20	15.48	45.11
MUP 50p	3.63	29.53	34.80	4.33	30.92	82.81

Table 4.5: Summary of estimated effect of pricing policies on retailer and duty/VAT revenue in England

	Change in duty + VAT revenue (£ million)			Total change in retailer revenue after duty +VAT (£ million)		
	Off-trade	On-trade	Total	Off-trade	On-trade	Total
General price +10%	-33.4	-53.3	-86.7	539.7	504.1	1043.9
MUP 40p	-8.0	-27.4	-35.4	95.6	-56.6	39.0
MUP 45p	-17.7	-30.9	-48.5	201.1	-62.2	138.9
MUP 50p	-29.7	-31.9	-61.6	375.2	-61.4	313.9

Table 4.6: Summary of estimated percentage change in retailer and duty/VAT revenue in England

		Change in duty + VAT			Total change in retailer received after duty +VAT		
		Off-trade	On-trade	Total	Off-trade	On-trade	Total
Baseline receipts (£ million)		4595.7	4133.5	8729.1	3565.7	9068.1	12633.8
% change from baseline	General price +10%	-0.7%	-1.3%	-1.0%	15.1%	5.6%	8.3%
	MUP 40p	-0.2%	-0.7%	-0.4%	2.7%	-0.6%	0.3%
	MUP 45p	-0.4%	-0.7%	-0.6%	5.6%	-0.7%	1.1%
	MUP 50p	-0.6%	-0.8%	-0.7%	10.5%	-0.7%	2.5%

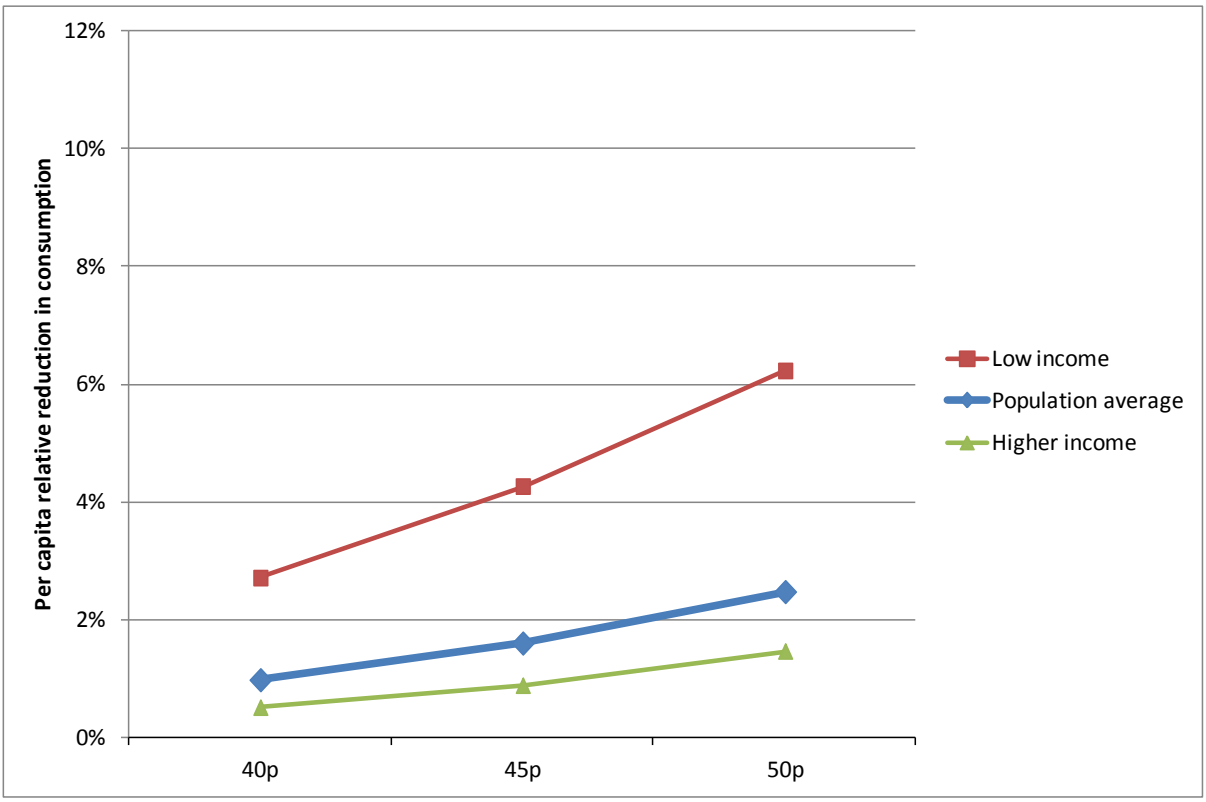

Figure 4-1: Summary of income-specific estimated effects of MUP policies on alcohol consumption in England

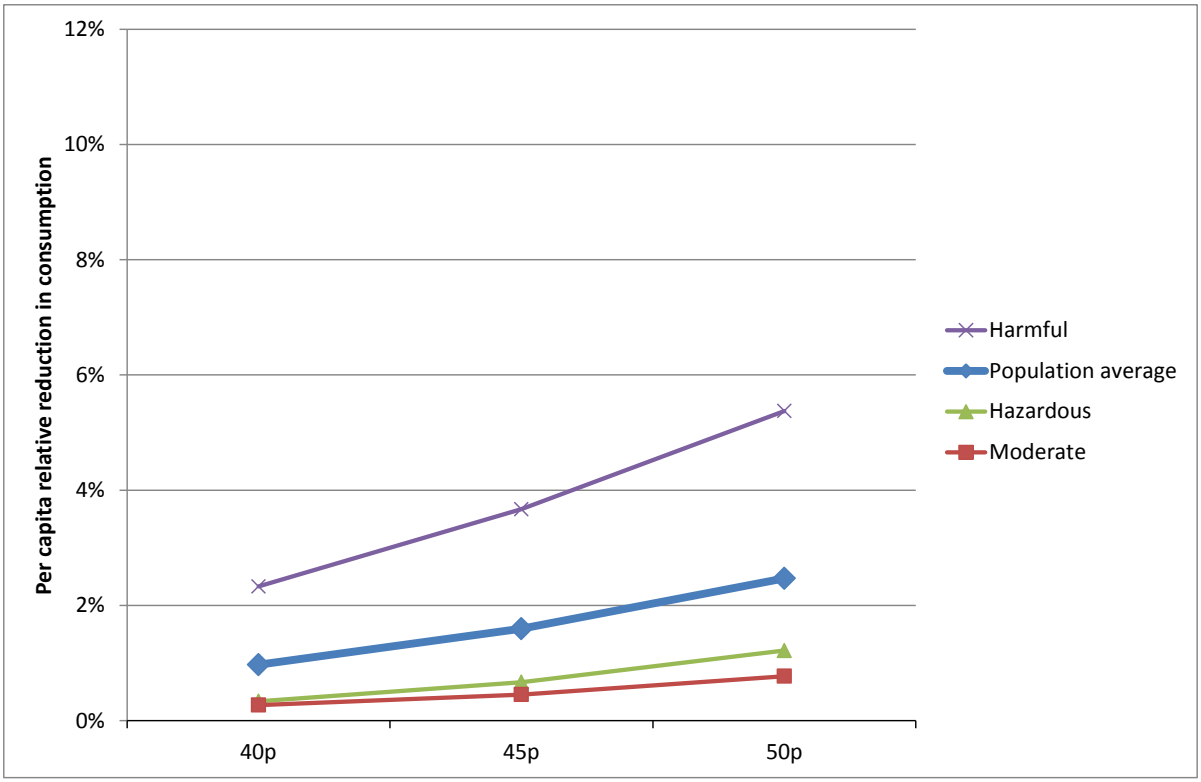

Figure 4-2: Summary of income-specific estimated effects of MUP policies on alcohol consumption in England

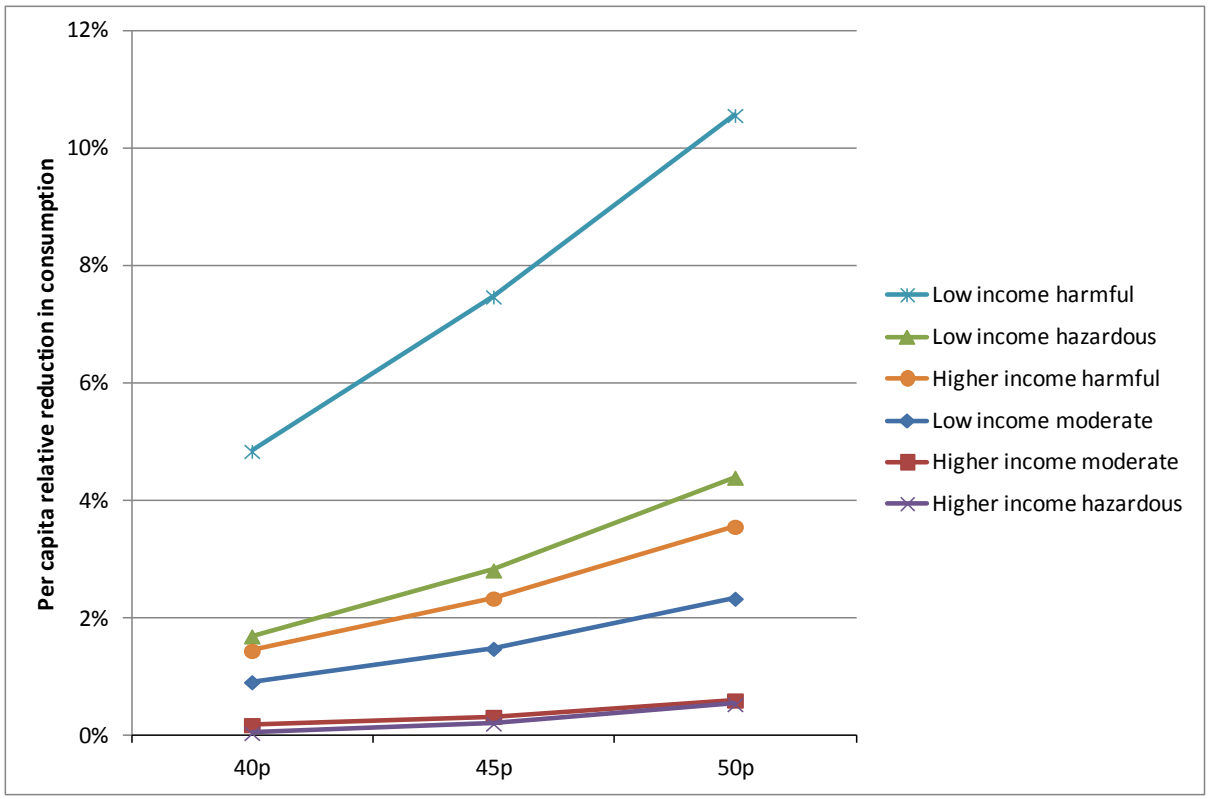

Figure 4-3: Summary of estimated effects of MUP policies on alcohol consumption in England by income and drinker groups

Table 4.7: Summary of estimated effects of pricing policies on health, crime and workplace related harm in England

		Year 1 Health Harm				Full Effect Health Harm in Year 10 per annum				Crime per annum				Workplace per annum
Population/subgroups	Policies	Deaths	Illness ('000s)	Hospital Admissions ('000s)	QALYs Saved ('000s)	Deaths	Illness ('000s)	Hospital Admissions ('000s)	10 Year Cumul Discounted QALYs ('000s)	Violent Crimes ('000s)	Criminal Damage ('000s)	Robbery Theft Other ('000s)	Total Crimes ('000s)	Days Absence ('000s)
England population	General price +10%	-431	-14.8	-19.0	-4.7	-1781	-35.7	-61.1	-77.5	-27.6	-79.3	-14.1	-121.0	-867.3
	MUP 40p	-74	-2.4	-3.5	-0.8	-379	-7.8	-15.0	-14.8	-4.9	-14.4	-2.5	-21.8	-154.6
	MUP 45p	-123	-4.0	-5.7	-1.2	-624	-12.5	-23.7	-24.2	-7.8	-22.5	-3.9	-34.2	-247.6
	MUP 50p	-192	-6.2	-8.7	-1.9	-960	-18.7	-35.1	-37.1	-11.6	-33.2	-5.9	-50.7	-376.6
Low income	General price +10%	-132	-4.6	-6.3	-1.3	-551	-12.4	-22.6	-24.5					
	MUP 40p	-48	-1.6	-2.3	-0.5	-254	-5.3	-10.3	-9.7			n/a		n/a
	MUP 45p	-76	-2.5	-3.6	-0.7	-392	-8.2	-15.6	-15.2					
	MUP 50p	-111	-3.7	-5.2	-1.1	-557	-11.5	-21.8	-21.9					
Higher income	General price +10%	-300	-10.2	-12.8	-3.3	-1,231	-23.2	-38.5	-53.0					
	MUP 40p	-26	-0.8	-1.2	-0.3	-125	-2.5	-4.8	-5.0			n/a		n/a
	MUP 45p	-47	-1.5	-2.1	-0.5	-232	-4.3	-8.1	-9.0					
	MUP 50p	-81	-2.6	-3.5	-0.8	-404	-7.2	-13.3	-15.2					
Moderate	General price +10%	-121	-5.3	-6.3	-1.7	-133	-8.1	-11.5	-23.5	-11.4	-32.9	-5.9	-50.3	-353.0
	MUP 40p	-10	-0.4	-0.5	-0.2	-7	-0.6	-0.8	-2.5	-1.3	-4.0	-0.6	-5.9	-36.3
	MUP 45p	-17	-0.7	-0.9	-0.2	-11	-1.0	-1.4	-4.1	-1.9	-6.0	-1.0	-8.9	-55.8
	MUP 50p	-27	-1.2	-1.4	-0.4	-19	-1.7	-2.4	-6.6	-2.9	-8.9	-1.5	-13.3	-87.7
Hazardous	General price +10%	-161	-5.4	-6.6	-1.8	-695	-11.5	-18.1	-27.1	-10.6	-31.2	-5.4	-47.2	-335.1
	MUP 40p	-10	-0.4	-0.5	-0.2	-23	-0.5	-0.8	-2.0	-1.3	-4.0	-0.7	-6.1	-42.6
	MUP 45p	-21	-0.8	-1.0	-0.3	-60	-1.2	-1.8	-3.9	-2.3	-7.0	-1.2	-10.5	-73.9
	MUP 50p	-39	-1.5	-1.8	-0.5	-129	-2.5	-3.8	-7.1	-3.7	-11.0	-2.0	-16.7	-119.1
Harmful	General price +10%	-150	-4.1	-6.2	-1.2	-953	-16.0	-31.5	-26.8	-5.5	-15.2	-2.7	-23.5	-179.1
	MUP 40p	-53	-1.6	-2.4	-0.4	-349	-6.7	-13.4	-10.3	-2.3	-6.4	-1.1	-9.8	-75.8
	MUP 45p	-85	-2.5	-3.8	-0.7	-554	-10.3	-20.5	-16.2	-3.5	-9.5	-1.7	-14.8	-117.9
	MUP 50p	-125	-3.6	-5.4	-1.0	-812	-14.5	-29.0	-23.4	-5.0	-13.3	-2.4	-20.7	-169.8
16-17	General price +10%	-2	-0.1	-0.2	-0.1	-2	-0.1	-0.2	-0.4	-0.2	-2.6	-0.3	-3.1	-16.1
	MUP 40p	0	0.0	0.0	0.0	0	0.0	0.0	-0.1	-0.1	-0.4	0.0	-0.5	-2.7
	MUP 45p	-1	0.0	-0.1	0.0	0	0.0	-0.1	-0.2	-0.1	-0.7	-0.1	-0.9	-5.3
	MUP 50p	-1	-0.1	-0.1	0.0	-1	-0.1	-0.1	-0.2	-0.2	-1.1	-0.1	-1.4	-7.9
18-24 Hazardous	General price +10%	-12	-0.6	-0.8	-0.2	-11	-0.5	-0.7	-1.9	-3.4	-13.1	-1.8	-18.3	-91.4
	MUP 40p	-2	-0.1	-0.1	0.0	-2	-0.1	-0.1	-0.3	-0.5	-1.7	-0.2	-2.5	-15.5
	MUP 45p	-3	-0.2	-0.2	-0.1	-3	-0.2	-0.2	-0.5	-0.8	-3.1	-0.4	-4.3	-25.5
	MUP 50p	-5	-0.2	-0.3	-0.1	-4	-0.2	-0.3	-0.8	-1.3	-4.7	-0.7	-6.6	-38.0

Table 4.8: Summary of estimated percentage change in alcohol-attributable health, crime and employment harms in England

		Year 1 Health Harm				Full Effect Health Harm in Year 10 per annum				Crime per annum				Workplace per annum
Population/subgroups	Policies	Deaths	Illness ('000s)	Hospital Admissions ('000s)	QALYs Saved ('000s)	Deaths	Illness ('000s)	Hospital Admissions ('000s)	10 Year Cumul Discounted QALYs ('000s)	Violent Crimes ('000s)	Criminal Damage ('000s)	Robbery Theft Other ('000s)	Total Crimes ('000s)	Days Absence ('000s)
Baseline alcohol attributable harm (estimated by modelling zero consumption)		4,198	197	249	65	10,243	495	810	931	351	967	175	1,493	12,926
England population	General price +10%	-10.3%	-7.5%	-7.7%	-7.2%	-17.4%	-7.2%	-7.5%	-8.3%	-7.9%	-8.2%	-8.1%	-8.1%	-6.7%
	MUP 40p	-1.8%	-1.2%	-1.4%	-1.2%	-3.7%	-1.6%	-1.9%	-1.6%	-1.4%	-1.5%	-1.4%	-1.5%	-1.2%
	MUP 45p	-2.9%	-2.0%	-2.3%	-1.9%	-6.1%	-2.5%	-2.9%	-2.6%	-2.2%	-2.3%	-2.2%	-2.3%	-1.9%
	MUP 50p	-4.6%	-3.2%	-3.5%	-3.0%	-9.4%	-3.8%	-4.3%	-4.0%	-3.3%	-3.4%	-3.4%	-3.4%	-2.9%

Table 4.9: Summary of financial valuation of impact of pricing policies on health, crime and workplace related harm in England

		Value of Harm Reduction in Year 1 (£millions)					Value of Harm Reduction cumulative over 10 years discounted (£millions)				
Population/subgroups	Policies	Healthcare Costs	Crime Costs	Absence Costs	Total Direct Costs	Total Value of Harm Reduction incl QALYs	Healthcare Costs	Crime Costs	Absence Costs	Total Direct Costs	Total Value of Harm Reduction incl QALYs
England population	General price +10%	-93.5	-498.1	-97.8	-689.5	-970.8	-1,306.4	-4,142.8	-813.2	-6,262.3	-11,080.6
	MUP 40p	-15.4	-87.7	-16.7	-119.8	-164.7	-257.5	-729.8	-138.9	-1,126.2	-2,107.6
	MUP 45p	-25.3	-138.1	-27.0	-190.5	-264.5	-417.2	-1,148.8	-224.8	-1,790.8	-3,381.9
	MUP 50p	-39.4	-205.9	-41.5	-286.8	-402.5	-634.2	-1,712.6	-345.2	-2,692.1	-5,105.2
Low income	General price +10%	-28.4					-447.6				
	MUP 40p	-9.8			n/a		-173.7			n/a	
	MUP 45p	-15.5					-270.4				
	MUP 50p	-22.8					-387.5				
Higher income	General price +10%	-65.1					-858.8				
	MUP 40p	-5.6			n/a		-83.8			n/a	
	MUP 45p	-9.8					-146.9				
	MUP 50p	-16.6					-246.7				
Moderate	General price +10%	-33.9	-205.7	-40.4	-279.9	-383.2	-364.0	-1,710.5	-336.0	-2,410.5	-3,815.1
	MUP 40p	-2.9	-22.8	-3.7	-29.5	-38.0	-30.3	-189.8	-30.9	-251.0	-399.2
	MUP 45p	-4.8	-34.6	-5.9	-45.3	-59.1	-49.5	-287.9	-48.9	-386.3	-627.8
	MUP 50p	-7.8	-52.5	-9.5	-69.8	-92.7	-82.0	-436.6	-78.9	-597.6	-985.8
Hazardous	General price +10%	-34.5	-192.0	-37.1	-263.6	-368.9	-443.5	-1,596.9	-308.7	-2,349.1	-3,960.9
	MUP 40p	-2.8	-23.0	-4.4	-30.2	-38.5	-28.2	-191.1	-36.8	-256.1	-369.9
	MUP 45p	-5.4	-40.1	-7.8	-53.3	-69.4	-58.4	-333.5	-64.6	-456.5	-683.6
	MUP 50p	-9.7	-64.0	-12.7	-86.4	-115.3	-110.4	-532.5	-105.5	-748.4	-1,166.1
Harmful	General price +10%	-25.2	-100.4	-20.3	-145.9	-218.7	-498.8	-835.4	-168.5	-1,502.7	-3,304.6
	MUP 40p	-9.6	-41.9	-8.6	-60.1	-88.1	-199.0	-348.8	-71.2	-619.0	-1,338.5
	MUP 45p	-15.1	-63.4	-13.4	-91.9	-136.0	-309.4	-527.4	-111.2	-948.0	-2,070.5
	MUP 50p	-21.9	-89.4	-19.3	-130.6	-194.5	-441.8	-743.5	-160.8	-1,346.1	-2,953.3
16-17	General price +10%	-1.0	-8.3	-0.6	-9.9	-13.2	-8.3	-68.8	-5.2	-82.3	-108.8
	MUP 40p	-0.2	-1.1	-0.1	-1.4	-2.0	-1.4	-9.5	-0.8	-11.7	-16.7
	MUP 45p	-0.3	-2.3	-0.2	-2.8	-4.0	-2.7	-18.9	-1.6	-23.2	-32.7
	MUP 50p	-0.5	-3.5	-0.3	-4.3	-6.0	-4.0	-28.9	-2.4	-35.3	-49.4
18-24 Hazardous	General price +10%	-3.9	-58.3	-6.3	-68.5	-81.2	-32.3	-484.8	-52.5	-569.6	-685.6
	MUP 40p	-0.6	-7.7	-1.0	-9.3	-11.6	-5.2	-63.8	-8.7	-77.7	-97.6
	MUP 45p	-1.1	-13.5	-1.7	-16.3	-19.9	-8.7	-112.5	-14.4	-135.7	-168.3
	MUP 50p	-1.6	-20.8	-2.6	-25.0	-30.3	-13.1	-172.8	-21.6	-207.5	-256.0

Table 4.10: Summary of income-specific estimated effects and financial valuation of impacts of pricing policies on health harm related to alcohol in England

		Year 1 Health Harm				Full Effect Health Harm in Year 10 per annum				Value of Harm Reduction in Year 1 (£millions)			Value of Harm Reduction cumulative discounted (£millions)		
Population/subgroups	Policies	Deaths	Illness ('000s)	Hospital Admissions ('000s)	QALYs Saved ('000s)	Deaths	Illness ('000s)	Hospital Admissions ('000s)	10 Year Cumul Discounted QALYs ('000s)	Healthcare Costs	Health QALYs Value	Total Value of Health Harm Reduction incl QALYs	Healthcare Costs	Health QALYs Value	Total Value of Health Harm Reduction incl QALYs
Low income moderate	General price +10%	-34	-1.6	-1.8	-0.5	-29	-2.5	-3.5	-7.1	-10.1	-30.0	-40.0	-112.0	-423.4	-535.4
	MUP 40p	-6	-0.3	-0.3	-0.1	-3	-0.4	-0.5	-1.6	-1.8	-5.4	-7.2	-18.5	-95.2	-113.7
	MUP 45p	-9	-0.4	-0.5	-0.1	-4	-0.6	-0.9	-2.5	-2.8	-8.6	-11.4	-30.5	-151.8	-182.3
	MUP 50p	-14	-0.7	-0.8	-0.2	-7	-1.0	-1.4	-3.8	-4.4	-13.4	-17.8	-48.4	-230.8	-279.3
Low income hazardous	General price +10%	-38	-1.3	-1.6	-0.4	-162	-2.7	-4.1	-6.4	-8.2	-25.0	-33.1	-105.7	-383.7	-489.4
	MUP 40p	-10	-0.4	-0.5	-0.1	-40	-0.7	-1.1	-1.9	-2.4	-7.6	-10.0	-29.4	-113.0	-142.4
	MUP 45p	-16	-0.6	-0.8	-0.2	-68	-1.2	-1.9	-3.1	-3.9	-12.6	-16.5	-49.0	-186.6	-235.6
	MUP 50p	-26	-1.0	-1.2	-0.3	-108	-1.9	-2.9	-4.8	-6.1	-19.6	-25.7	-76.8	-289.2	-366.0
Low income harmful	General price +10%	-61	-1.7	-2.9	-0.4	-360	-7.3	-15.0	-11.0	-10.2	-26.0	-36.2	-229.8	-662.2	-892.0
	MUP 40p	-33	-0.9	-1.5	-0.3	-212	-4.2	-8.6	-6.3	-5.7	-15.3	-20.9	-125.7	-376.7	-502.4
	MUP 45p	-50	-1.5	-2.3	-0.4	-320	-6.3	-12.9	-9.6	-8.8	-23.7	-32.5	-190.9	-573.7	-764.5
	MUP 50p	-71	-2.0	-3.2	-0.6	-442	-8.6	-17.4	-13.2	-12.3	-33.4	-45.6	-262.3	-793.4	-1,055.7
Higher income moderate	General price +10%	-87	-3.7	-4.4	-1.3	-104	-5.6	-8.0	-16.5	-23.8	-75.0	-98.8	-252.0	-988.8	-1,240.8
	MUP 40p	-4	-0.2	-0.2	-0.1	-4	-0.2	-0.3	-0.9	-1.2	-3.6	-4.8	-11.8	-55.6	-67.4
	MUP 45p	-7	-0.3	-0.4	-0.1	-7	-0.4	-0.5	-1.6	-2.0	-6.1	-8.0	-19.0	-93.7	-112.7
	MUP 50p	-13	-0.5	-0.6	-0.2	-12	-0.7	-0.9	-2.7	-3.4	-10.8	-14.2	-33.6	-163.8	-197.5
Higher income hazardou	General price +10%	-123	-4.1	-5.0	-1.3	-533	-8.9	-14.0	-20.7	-26.3	-80.8	-107.2	-337.8	-1,244.3	-1,582.0
	MUP 40p	-1	-0.1	-0.1	0.0	17	0.2	0.4	-0.1	-0.5	-1.7	-2.2	1.2	-5.5	-4.3
	MUP 45p	-4	-0.2	-0.3	-0.1	8	0.0	0.0	-0.8	-1.5	-5.0	-6.5	-9.3	-46.8	-56.2
	MUP 50p	-13	-0.5	-0.7	-0.2	-21	-0.6	-0.8	-2.3	-3.6	-11.4	-15.0	-33.6	-137.3	-170.9
Higher income harmful	General price +10%	-89	-2.4	-3.3	-0.7	-593	-8.7	-16.5	-15.8	-15.0	-44.0	-59.0	-269.0	-945.5	-1,214.5
	MUP 40p	-21	-0.6	-0.9	-0.2	-138	-2.4	-4.8	-4.0	-4.0	-11.7	-15.6	-73.3	-241.6	-314.9
	MUP 45p	-35	-1.0	-1.5	-0.3	-234	-3.9	-7.7	-6.6	-6.4	-18.7	-25.1	-118.5	-396.5	-515.0
	MUP 50p	-55	-1.5	-2.2	-0.5	-370	-5.9	-11.5	-10.2	-9.6	-28.3	-37.9	-179.5	-610.0	-789.5

4.2 EXAMPLE POLICY ANALYSIS: 45P MUP (2014/15 PRICES)

The estimated impacts of a 45p MUP policy in 2014/15 prices are described in detail in this section. We assume that the threshold is updated annually in line with inflation.

In addition to the results shown in Tables 4.1 to 4.10, Tables 4.11 to 4.14 show further detailed results for consumption changes, consumer spending and sales for a 45p MUP policy. Table 4.15 shows the estimated relative change in price for the 10 modelled beverage types and beverage-specific changes in consumption and spending for a 45p MUP policy. Detailed results for other modelled policies are not presented here but are available from the authors.

Across the whole population, 23.2% of alcohol units purchased would be affected. The proportion and absolute number of purchased units per week affected for harmful drinkers (30.5% or 21.8 units) is substantially greater than for hazardous (19.5% or 5.3 units) or moderate drinkers (12.5% or 0.7 units). The proportion and number of purchased units per week affected is also greater for low income vs. higher income drinkers in each of the moderate (18.4% vs. 10.5% or 0.8 vs. 0.6 units), hazardous (29.0% vs. 16.8% or 7.9 vs. 4.6 units) and harmful (40.7% vs. 28.0% or 31.0 vs. 19.6 units) drinker groups.

Across the whole population, weekly consumption changes by -1.6% on average. Consumption is estimated to reduce by 0.19 units per person or 0.23 units per drinker per week. Weekly consumption reductions are larger for harmful drinkers (-3.7% or -2.62 units) than moderate drinkers (-0.6% or -0.03 units) and for those with low incomes (-4.3% or -0.54 units) compared to those with higher incomes (-0.9% or -0.13 units).

In both the low and higher income groups, consumption reductions are small for moderate drinkers and larger for harmful drinkers. Estimated consumption reductions for low income moderate drinkers are -1.5% or -0.07 units compared to -7.5% or -5.70 units for low income harmful drinkers. The corresponding figures for higher income moderate and harmful drinkers are -0.3% or -0.02 units and -2.3% or -1.63 units.

The small impact on moderate drinkers reflects the small amount of alcohol purchased for less than 45p per unit by moderate drinkers in either income group. In contrast, the larger impacts on harmful drinkers, and particularly harmful drinkers with low incomes, reflects the larger quantities of alcohol purchased below the MUP threshold by these groups.

Across the whole population, spending increases by 0.4% or £2.60 per drinker per year. The cost impact of the policy on consumer spending also varies substantially between drinker and income subgroups. Annual spending increases are larger for hazardous drinkers

(£9.70) than moderate drinkers (£0.90) and it is estimated that spending slightly decreases for harmful drinkers (-£1.70). Unlike the consumption results, the impacts on annual spending are estimated to be greater for higher income drinkers (£3.90), while low income drinkers are estimated to slightly decrease their spending (-£1.70). For higher income groups, increases in spending are larger for harmful drinkers (£9.70) than moderate drinkers (£1.10). However, for low income groups, we see a significant reduction in estimated spending changes for harmful drinkers (-£37.40), mainly driven by reductions in spending on off-trade cider, and a small increase for moderate drinkers (£0.30). Within each drinker category, higher income drinkers see larger increases in their annual alcohol spending than low income drinkers. This difference is a result of the different price elasticities of the beverages which greater or lesser proportions of each subgroup's alcohol purchases.

Overall revenue to the Treasury (from duty and VAT receipts) changes by -£48.5m (-17.7m and -£30.9m for off- and on-trade).

Revenue to off- retailers is estimated to increase by £201.1m in the off-trade and decrease by £62.2m in the on-trade.

As with previous results from SAPM, the estimated impacts on revenue to the Treasury are broadly neutral as falling duty receipts due to lower sales are largely matched by increased VAT receipts due to the higher value of the remaining sales.

Effects on health are estimated to be substantial with alcohol-attributable deaths estimated to reduce by approximately 123 per annum in the first year following implementation and by 624 per annum from the tenth year, by which time the model assumes the full effects of the policy will be seen. Annual reductions in deaths from year 10 are distributed differentially across the drinker groups, with approximately 11 saved amongst moderate drinkers, 60 amongst hazardous drinkers and 554 amongst harmful drinkers. Larger reductions in deaths per annum from year 10 are also seen amongst low income drinkers (-392) than higher income drinkers (-232).

Alcohol-attributable morbidity also decreases with an estimated reduction of 12,500 illnesses and 23,700 hospital admission per annum across all drinkers from year 10. Direct healthcare service costs are estimated to reduce by £25.3m in year 1 and by £417.2m in total over the first ten years of the policy.

Crime is estimated to fall by 34,200 offences per year overall. Almost 43% of this annual reduction, or 14,800 crimes, are attributable to harmful drinkers who account for around 5% of the population. A further 31% or 10,500 fewer crimes are attributable to hazardous

drinkers who account for around 18% of the population. Costs of crime are estimated to reduce by £138.1m per year.

Workplace absence is estimated to be reduced by 247,600 days per year. This is estimated to lead to savings of £27m per year.

The total societal value of these harm reductions to health, crime and workplace absence is estimated at £3.4bn in total over the 10 year period modelled. This includes both direct costs and gains in QALYs. In the first year, the estimated societal value of the harm reductions is as follows: NHS direct cost reductions (£25.3m), crime costs saved (£138.1m), workplace absences avoided (£27.0m), and the total year 1 value of harm reduction including health QALYs is £264.5m. The societal value of the £3.4bn of harm reductions over the 10 year period is distributed differentially across the drinker groups, with reductions in alcohol consumption among harmful drinkers accounting for 61.2% of the total value, hazardous drinkers 20.2% and moderate drinkers 18.6%.

Table 4.11: Detailed results for 45p MUP (consumption and spending effects)

	Population	Moderate	Hazardous	Harmful	Low income	Higher income	16-17	18-24 Hazardous
Baseline statistics								
Baseline Consumption (units per week)	11.9	4.3	27.2	71.4	9.3	12.9	7.8	27.6
Population	41,393,296	31,964,234	7,232,457	2,196,605	11,224,815	30,168,481	1,041,951	655,712
Baseline Consumption (drinker)	14.1	5.5	27.2	71.4	12.7	14.6	11.0	27.6
Drinker population	34,889,490	25,460,428	7,232,457	2,196,605	8,213,926	26,675,564	738,841	655,712
% drinkers	84.3%	79.7%	100.0%	100.0%	73.2%	88.4%	70.9%	100.0%
% binge (>8 male, >6 female)	21.7%	11.4%	49.4%	79.4%	14.8%	24.2%	16.3%	70.8%
Mean binge if binge occurs	12.1	10.2	12.4	15.1	12.7	12.0	12.5	14.6
Sales/Consumption volume, units per drinker per year								
Off-beer	96.8	29.6	169.6	636.0	113.5	91.6	40.0	128.1
Off-cider	18.9	4.8	24.8	162.6	33.4	14.4	24.9	17.1
Off-wine	264.5	92.1	584.2	1,210.0	175.1	292.0	86.1	184.6
Off-spirits	71.1	27.2	128.1	392.3	93.3	64.3	23.6	157.9
Off-RTDs	7.8	2.1	8.7	71.7	10.1	7.2	16.4	18.7
On-beer	199.4	80.2	371.4	1,014.7	187.7	203.0	163.2	555.0
On-cider	7.7	3.2	13.2	42.5	6.6	8.1	11.0	34.7
On-wine	37.9	26.8	68.0	68.3	15.5	44.8	27.0	57.8
On-spirits	19.8	14.2	31.6	46.0	14.9	21.3	62.8	160.3
On-RTDs	12.3	4.5	19.6	78.0	11.5	12.5	118.9	124.7
Total	**736.2**	**284.5**	**1,419.3**	**3,722.1**	**661.6**	**759.1**	**573.9**	**1,438.9**
Spending, per drinker per year (£)								
Off-beer	43.08	14.54	76.51	263.83	48.64	41.37	12.33	56.01
Off-cider	7.03	2.14	9.81	54.58	11.23	5.74	10.88	7.11
Off-wine	143.16	51.74	314.08	639.95	83.73	161.46	4.49	97.34
Off-spirits	34.60	14.23	61.86	180.91	42.90	32.04	2.50	74.69
Off-RTDs	6.05	1.99	7.07	49.67	7.46	5.61	2.36	19.92
On-beer	246.57	104.80	455.97	1,200.37	212.72	257.00	179.67	698.52
On-cider	9.27	3.98	15.98	48.53	6.80	10.04	5.60	41.23
On-wine	52.04	37.19	91.73	93.57	17.93	62.54	24.06	77.08
On-spirits	48.34	36.23	74.68	102.05	33.04	53.05	128.78	368.00
On-RTDs	22.15	8.58	34.87	137.60	18.93	23.14	188.48	226.85
Total	**612.30**	**275.43**	**1,142.56**	**2,771.06**	**483.38**	**652.00**	**559.15**	**1,666.74**
After intervention / Change from baseline								
Changes in consumption (units per week)	-0.19	-0.02	-0.18	-2.62	-0.40	-0.11	-0.03	-0.41
Changes in consumption (drinker)	-0.23	-0.03	-0.18	-2.62	-0.54	-0.13	-0.05	-0.41
Changes in consumption (%)	**-1.6%**	**-0.6%**	**-0.7%**	**-3.7%**	**-4.3%**	**-0.9%**	**-0.4%**	**-1.5%**
Final Consumption (drinker)	13.9	5.4	27.0	68.8	12.1	14.4	11.0	27.2
Absolute change in sales/Consumption volume, units per drinker per year								
Off-beer	-5.7	-0.8	-8.8	-52.9	-7.2	-5.3	-1.9	-7.8
Off-cider	-7.2	-1.0	-8.2	-75.8	-16.4	-4.3	-0.6	-3.6
Off-wine	8.0	1.6	18.1	49.3	5.3	8.8	0.2	4.4
Off-spirits	-3.7	-0.8	-6.6	-27.8	-5.2	-3.2	-0.6	-6.0
Off-RTDs	-1.1	-0.1	-1.2	-12.0	-1.7	-0.9	-0.3	-2.3
On-beer	-3.1	-0.9	-5.0	-22.1	-3.7	-2.9	-0.5	-5.8
On-cider	0.2	0.1	0.3	1.4	0.2	0.2	0.0	0.7
On-wine	1.1	0.6	2.3	3.3	0.5	1.3	0.2	1.8
On-spirits	-0.4	-0.2	-0.6	-1.5	-0.4	-0.4	0.0	-3.4
On-RTDs	0.1	0.0	0.2	1.6	0.3	0.1	1.1	0.7
Total	**-11.7**	**-1.6**	**-9.5**	**-136.6**	**-28.2**	**-6.7**	**-2.5**	**-21.4**
Absolute change in spending, per drinker per year (£)								
Off-beer	0.59	0.16	1.09	3.85	0.88	0.49	-0.05	0.52
Off-cider	-1.36	-0.16	-1.55	-14.67	-3.22	-0.79	0.82	-0.55
Off-wine	7.72	2.01	16.22	45.99	6.37	8.14	0.09	5.44
Off-spirits	-0.74	-0.07	-1.46	-6.20	-0.72	-0.75	0.02	-0.10
Off-RTDs	-0.95	-0.14	-0.94	-10.32	-1.37	-0.82	-0.04	-2.48
On-beer	-3.71	-1.14	-5.95	-26.12	-4.15	-3.57	-0.49	-7.19
On-cider	0.24	0.08	0.42	1.63	0.26	0.24	0.00	0.82
On-wine	1.51	0.78	3.09	4.69	0.65	1.77	0.20	2.42
On-spirits	-0.97	-0.61	-1.48	-3.47	-0.91	-0.98	-0.08	-7.91
On-RTDs	0.25	0.01	0.29	2.91	0.48	0.19	1.74	1.19
Total	**2.59**	**0.93**	**9.75**	**-1.70**	**-1.74**	**3.92**	**2.23**	**-7.83**
Relative change in spending	**0.4%**	**0.3%**	**0.9%**	**-0.1%**	**-0.4%**	**0.6%**	**0.4%**	**-0.5%**

Table 4.12: Detailed income and drinker group-specific results for 45p MUP (consumption and spending effects)

	Low income moderate	Low income hazardous	Low income harmful	Higher income moderate	Higher income hazardous	Higher income harmful
Baseline statistics						
Baseline Consumption (units per week)	3.1	27.2	76.2	4.9	27.2	69.8
Population	9,418,385	1,273,410	533,020	22,545,849	5,959,047	1,663,585
Baseline Consumption (drinker)	4.5	27.2	76.2	5.8	27.2	69.8
Drinker population	6,407,497	1,273,410	533,020	19,052,931	5,959,047	1,663,585
% drinkers	68.0%	100.0%	100.0%	84.5%	100.0%	100.0%
% binge (>8 male, >6 female)	7.0%	47.3%	74.9%	13.3%	49.8%	80.8%
Mean binge if binge occurs	9.9	13.2	16.0	10.3	12.2	14.8
Sales/Consumption volume, units per drinker per year						
Off-beer	31.7	233.9	808.8	28.8	155.9	580.7
Off-cider	5.2	48.2	337.0	4.6	19.8	106.8
Off-wine	70.4	442.7	794.7	99.3	614.4	1,343.1
Off-spirits	33.5	186.2	591.0	25.1	115.7	328.6
Off-RTDs	2.7	18.0	80.4	1.9	6.7	68.9
On-beer	64.0	390.5	1,190.2	85.6	367.3	958.5
On-cider	1.9	17.6	36.6	3.6	12.3	44.4
On-wine	10.8	31.8	32.9	32.1	75.8	79.6
On-spirits	11.0	22.4	44.0	15.3	33.6	46.6
On-RTDs	4.4	27.3	58.8	4.6	18.0	84.1
Total	**235.6**	**1,418.6**	**3,974.5**	**300.9**	**1,419.5**	**3,641.3**
Spending, per drinker per year (£)						
Off-beer	4.80	100.76	328.55	14.39	71.33	243.09
Off-cider	0.73	16.70	106.36	2.11	8.34	37.99
Off-wine	11.90	209.88	372.04	57.48	336.35	725.79
Off-spirits	5.73	83.07	258.10	13.30	57.33	156.18
Off-RTDs	0.82	13.36	53.83	1.84	5.73	48.34
On-beer	23.81	446.46	1,288.72	114.23	458.00	1,172.06
On-cider	0.72	19.09	31.80	4.56	15.32	53.89
On-wine	4.32	36.25	35.77	45.38	103.58	112.09
On-spirits	8.58	46.59	91.50	39.84	80.68	105.43
On-RTDs	2.72	46.14	86.31	8.80	32.47	154.03
Total	**64.14**	**1,018.29**	**2,652.99**	**301.94**	**1,169.12**	**2,808.89**
After intervention / Change from baseline						
Changes in consumption (units per week)	-0.05	-0.77	-5.70	-0.02	-0.06	-1.63
Changes in consumption (drinker)	-0.07	-0.77	-5.70	-0.02	-0.06	-1.63
Changes in consumption (%)	**-1.5%**	**-2.8%**	**-7.5%**	**-0.3%**	**-0.2%**	**-2.3%**
Final Consumption (drinker)	4.5	26.4	70.5	5.8	27.2	68.2
Absolute change in sales/Consumption volume, units per drinker per year						
Off-beer	-1.1	-14.0	-64.4	-0.7	-7.7	-49.2
Off-cider	-1.3	-21.5	-185.8	-0.9	-5.4	-40.6
Off-wine	0.9	15.4	34.4	1.8	18.7	54.1
Off-spirits	-0.9	-10.7	-43.3	-0.7	-5.7	-22.8
Off-RTDs	-0.2	-2.9	-16.2	-0.1	-0.8	-10.6
On-beer	-0.9	-8.0	-26.2	-0.9	-4.3	-20.8
On-cider	0.1	0.7	1.4	0.1	0.3	1.4
On-wine	0.3	1.3	1.9	0.7	2.5	3.7
On-spirits	-0.3	-0.7	-1.7	-0.2	-0.6	-1.5
On-RTDs	0.0	0.4	2.9	0.0	0.1	1.2
Total	**-3.5**	**-40.0**	**-297.0**	**-1.0**	**-2.9**	**-85.2**
Absolute change in spending, per drinker per year (£)						
Off-beer	0.20	2.00	6.41	0.15	0.90	3.03
Off-cider	-0.21	-4.22	-37.04	-0.14	-0.98	-7.50
Off-wine	1.82	16.12	37.84	2.07	16.24	48.61
Off-spirits	-0.04	-1.31	-7.59	-0.08	-1.49	-5.76
Off-RTDs	-0.22	-2.20	-13.13	-0.11	-0.68	-9.42
On-beer	-1.12	-9.12	-28.73	-1.14	-5.27	-25.28
On-cider	0.06	0.76	1.44	0.08	0.35	1.70
On-wine	0.34	1.60	2.12	0.93	3.41	5.52
On-spirits	-0.58	-1.34	-3.88	-0.62	-1.50	-3.34
On-RTDs	0.04	0.74	5.14	0.01	0.20	2.19
Total	**0.28**	**3.03**	**-37.42**	**1.15**	**11.18**	**9.75**
Relative change in spending	**0.4%**	**0.3%**	**-1.4%**	**0.4%**	**1.0%**	**0.3%**

Table 4.13: Detailed male income and drinker group specific results for 45p MUP (consumption and spending effects)

	Low income male moderate	Low income male hazardous	Low income male harmful	Higher income male moderate	Higher income male hazardous	Higher income male harmful
Baseline statistics						
Baseline Consumption (units per week)	4.6	32.3	88.0	6.5	31.5	77.8
Population	3,729,369	665,358	329,900	10,310,984	3,331,242	993,115
Baseline Consumption (drinker)	6.3	32.3	88.0	7.5	31.5	77.8
Drinker population	2,719,609	665,358	329,900	8,975,155	3,331,242	993,115
% drinkers	72.9%	100.0%	100.0%	87.0%	100.0%	100.0%
% binge (>8 male, >6 female)	9.4%	43.8%	77.1%	15.0%	49.4%	81.4%
Mean binge if binge occurs	11.0	13.9	17.3	12.1	13.7	16.7
Sales/Consumption volume, units per drinker per year						
Off-beer	54.4	299.4	1,058.4	45.1	218.9	754.0
Off-cider	7.9	57.6	429.9	6.3	25.7	130.9
Off-wine	58.9	354.7	556.1	88.2	509.7	1,008.7
Off-spirits	38.3	179.5	558.6	25.6	113.3	373.3
Off-RTDs	2.7	7.9	22.2	0.9	3.9	15.5
On-beer	133.9	677.0	1,800.0	164.3	620.3	1,522.3
On-cider	3.4	27.5	48.0	6.4	19.2	66.8
On-wine	11.5	37.2	29.1	37.2	87.2	71.6
On-spirits	12.4	24.4	38.2	14.9	32.1	51.7
On-RTDs	3.7	17.1	50.2	2.7	11.7	64.1
Total	**327.1**	**1,682.2**	**4,590.7**	**391.7**	**1,642.0**	**4,059.0**
Spending, per drinker per year (£)						
Off-beer	7.84	130.74	431.25	22.46	100.50	316.34
Off-cider	0.97	19.00	124.95	2.89	10.72	46.08
Off-wine	8.97	174.77	273.98	52.05	288.60	589.11
Off-spirits	5.65	80.76	247.59	13.44	55.90	179.11
Off-RTDs	0.76	8.56	0.04	0.85	2.46	14.47
On-beer	48.49	771.74	1,968.24	218.47	773.04	1,858.17
On-cider	1.23	29.67	39.85	8.16	23.96	80.71
On-wine	4.20	42.73	33.63	53.84	120.05	106.83
On-spirits	8.45	48.44	75.02	37.87	75.69	118.83
On-RTDs	1.98	31.06	69.13	5.25	22.06	117.40
Total	**88.53**	**1,337.47**	**3,263.68**	**415.28**	**1,472.98**	**3,427.07**
After intervention / Change from baseline						
Changes in consumption (units per week)	-0.09	-1.02	-7.53	-0.04	-0.19	-2.47
Changes in consumption (drinker)	-0.12	-1.02	-7.53	-0.05	-0.19	-2.47
Changes in consumption (%)	**-1.9%**	**-3.2%**	**-8.5%**	**-0.6%**	**-0.6%**	**-3.2%**
Final Consumption (drinker)	6.2	31.2	80.5	7.5	31.3	75.4
Absolute change in sales/Consumption volume, units per drinker per year						
Off-beer	-1.7	-14.2	-79.8	-1.1	-10.3	-62.1
Off-cider	-2.3	-29.9	-262.6	-1.2	-7.3	-50.4
Off-wine	1.0	15.8	28.0	1.7	18.3	42.9
Off-spirits	-1.1	-11.2	-42.4	-0.8	-6.1	-25.9
Off-RTDs	-0.3	-1.3	-0.8	-0.1	-0.5	-3.0
On-beer	-1.9	-14.2	-39.4	-1.7	-7.3	-33.6
On-cider	0.1	1.1	1.8	0.1	0.4	2.1
On-wine	0.3	1.6	1.7	0.8	3.0	3.4
On-spirits	-0.4	-0.9	-1.5	-0.3	-0.5	-2.2
On-RTDs	-0.1	0.1	2.6	0.0	0.3	0.4
Total	**-6.3**	**-53.1**	**-392.5**	**-2.5**	**-10.1**	**-128.6**
Absolute change in spending, per drinker per year (£)						
Off-beer	0.38	3.14	8.97	0.22	1.32	4.14
Off-cider	-0.40	-6.13	-54.81	-0.20	-1.37	-9.32
Off-wine	1.42	13.50	25.94	1.83	14.82	38.38
Off-spirits	-0.13	-2.16	-10.04	-0.16	-1.73	-7.20
Off-RTDs	-0.26	-1.40	-0.01	-0.06	-0.25	-2.78
On-beer	-2.35	-16.05	-43.64	-2.23	-8.90	-40.80
On-cider	0.12	1.22	1.87	0.15	0.54	2.53
On-wine	0.38	1.89	2.02	1.21	4.09	5.20
On-spirits	-0.82	-1.70	-3.69	-0.75	-1.20	-4.91
On-RTDs	-0.08	0.34	5.11	-0.04	0.48	0.64
Total	**-1.75**	**-7.35**	**-68.28**	**-0.04**	**7.79**	**-14.13**
Relative change in spending	**-2.0%**	**-0.5%**	**-2.1%**	**0.0%**	**0.5%**	**-0.4%**

Table 4.14: Detailed female income and drinker group-specific results for 45p MUP (consumption and spending effects)

	Low income female moderate	Low income female hazardous	Low income female harmful	Higher income female moderate	Higher income female hazardous	Higher income female harmful
Baseline statistics						
Baseline Consumption (units per week)	2.1	21.7	57.0	3.5	21.8	58.0
Population	5,689,016	608,052	203,120	12,234,865	2,627,805	670,470
Baseline Consumption (drinker)	3.2	21.7	57.0	4.2	21.8	58.0
Drinker population	3,687,888	608,052	203,120	10,077,776	2,627,805	670,470
% drinkers	64.8%	100.0%	100.0%	82.4%	100.0%	100.0%
% binge (>8 male, >6 female)	5.4%	51.1%	71.4%	11.9%	50.4%	79.9%
Mean binge if binge occurs	9.1	12.6	13.8	8.8	10.3	12.1
Sales/Consumption volume, units per drinker per year						
Off-beer	15.0	162.3	403.2	14.4	76.0	323.9
Off-cider	3.3	37.9	186.0	3.0	12.4	71.0
Off-wine	79.0	538.9	1,182.1	109.3	747.2	1,838.4
Off-spirits	29.9	193.5	643.8	24.6	118.8	262.3
Off-RTDs	2.6	29.1	175.0	2.8	10.4	148.0
On-beer	12.5	77.0	199.8	15.5	46.5	123.4
On-cider	0.8	6.8	18.1	1.0	3.5	11.2
On-wine	10.2	25.8	39.1	27.6	61.3	91.5
On-spirits	10.0	20.2	53.5	15.6	35.4	39.1
On-RTDs	4.9	38.6	72.9	6.2	25.9	113.7
Total	**168.2**	**1,130.1**	**2,973.6**	**220.1**	**1,137.4**	**3,022.6**
Spending, per drinker per year (£)						
Off-beer	2.55	67.96	161.76	7.21	34.35	134.58
Off-cider	0.56	14.18	76.17	1.41	5.33	26.00
Off-wine	14.05	248.30	531.29	62.32	396.87	928.23
Off-spirits	5.78	85.59	275.18	13.17	59.13	122.22
Off-RTDs	0.88	18.61	141.20	2.73	9.87	98.52
On-beer	5.62	90.52	185.07	21.41	58.63	155.78
On-cider	0.35	7.51	18.73	1.35	4.36	14.15
On-wine	4.41	29.15	39.26	37.85	82.70	119.87
On-spirits	8.68	44.57	118.26	41.59	87.01	85.58
On-RTDs	3.27	62.63	114.21	11.96	45.66	208.29
Total	**46.15**	**669.03**	**1,661.13**	**201.00**	**783.91**	**1,893.23**
After intervention / Change from baseline						
Changes in consumption (units per week)	-0.02	-0.49	-2.72	0.01	0.12	-0.40
Changes in consumption (drinker)	-0.03	-0.49	-2.72	0.01	0.12	-0.40
Changes in consumption (%)	**-0.9%**	**-2.3%**	**-4.8%**	**0.2%**	**0.5%**	**-0.7%**
Final Consumption (drinker)	3.2	21.2	54.3	4.2	21.9	57.6
Absolute change in sales/Consumption volume, units per drinker per year						
Off-beer	-0.7	-13.8	-39.3	-0.3	-4.3	-30.0
Off-cider	-0.6	-12.4	-61.0	-0.6	-2.9	-26.0
Off-wine	0.8	15.0	44.8	1.9	19.2	70.6
Off-spirits	-0.7	-10.3	-44.7	-0.7	-5.2	-18.3
Off-RTDs	-0.2	-4.6	-41.1	-0.2	-1.3	-22.0
On-beer	-0.2	-1.3	-4.8	-0.1	-0.5	-1.8
On-cider	0.0	0.2	0.7	0.0	0.1	0.4
On-wine	0.3	1.1	2.2	0.5	1.9	4.2
On-spirits	-0.2	-0.4	-1.9	-0.2	-0.8	-0.4
On-RTDs	0.1	0.8	3.3	0.0	-0.1	2.4
Total	**-1.4**	**-25.6**	**-141.9**	**0.4**	**6.1**	**-20.9**
Absolute change in spending, per drinker per year (£)						
Off-beer	0.07	0.75	2.24	0.08	0.36	1.40
Off-cider	-0.08	-2.12	-8.17	-0.09	-0.49	-4.79
Off-wine	2.11	18.98	57.16	2.28	18.04	63.75
Off-spirits	0.04	-0.37	-3.61	0.00	-1.18	-3.61
Off-RTDs	-0.19	-3.06	-34.45	-0.16	-1.21	-19.27
On-beer	-0.21	-1.53	-4.52	-0.17	-0.66	-2.31
On-cider	0.02	0.25	0.75	0.02	0.10	0.47
On-wine	0.31	1.28	2.30	0.68	2.55	5.99
On-spirits	-0.41	-0.96	-4.19	-0.49	-1.88	-1.02
On-RTDs	0.12	1.18	5.19	0.05	-0.16	4.50
Total	**1.78**	**14.40**	**12.71**	**2.20**	**15.48**	**45.11**
Relative change in spending	**3.8%**	**2.2%**	**0.8%**	**1.1%**	**2.0%**	**2.4%**

4.15: Relative change in price for the modelled beverage types and beverage-specific impacts for 45p MUP on consumption and spending

	% change in price	Change in consumption	Change in spending
Off-trade beer	8.1%	-5.9%	1.4%
Off-trade cider	27.4%	-38.1%	-19.4%
Off-trade wine	2.4%	3.0%	5.4%
Off-trade spirits	3.3%	-5.2%	-2.1%
Off-trade RTDs	0.1%	-14.1%	-15.6%
Subtotal: Off-trade	**4.6%**	**-2.1%**	**2.2%**
On-trade beer	0.0%	-1.5%	-1.5%
On-trade cider	0.0%	2.6%	2.6%
On-trade wine	0.0%	2.9%	2.9%
On-trade spirits	0.0%	-2.0%	-2.0%
On-trade RTDs	0.0%	1.2%	1.2%
Subtotal: On-trade	**0.0%**	**-0.7%**	**-0.7%**
Subtotal: beer		**-3.0%**	**-1.1%**
Subtotal: cider		**-26.3%**	**-6.8%**
Subtotal: wine		**3.0%**	**4.7%**
Subtotal: spirits		**-4.5%**	**-2.1%**
Subtotal: RTDs		**-4.8%**	**-2.5%**
Total	**2.0%**	**-1.6%**	**0.4%**

4.3 SENSITIVITY ANALYSES

A probabilistic sensitivity analysis (PSA) to reflect uncertainty in the estimated elasticities used for the base case econometric model has been generated for a 45p MUP using 30 samples from the underlying variance-covariance matrices (derived from the econometric model). Estimated 95% confidence intervals for the change in mean consumption for the English population and selected subgroups are shown in Table 4.16.

Table 4.16: Probabilistic sensitivity analysis confidence interval estimates

Drink type	Central estimate	Lower 95% CI	Upper 95% CI
All	-1.6%	-0.3%	-3.2%
Low income	-4.3%	-2.5%	-6.4%
Higher income	-0.9%	0.4%	-2.4%
Moderate	-0.6%	0.2%	-1.4%
Hazardous	-0.7%	0.8%	-2.3%
Harmful	-3.7%	-1.9%	-6.2%

This uncertainty analysis has also examined the relative impact on low versus higher income groups and moderate versus harmful drinkers. Scatter plots are shown in Figures 4.4 and 4.5. Each point shown is an individual PSA result. A line of equal effect is plotted for each figure: estimates below and to the right of the line indicate that the low income group (or harmful drinkers) are affected more in relative terms by the policy than higher income group (or moderate drinkers). As is apparent from the plots, both low income group and harmful drinkers are estimated with a high degree of confidence to be more affected by a 45p MUP than higher income group or moderate drinkers respectively.

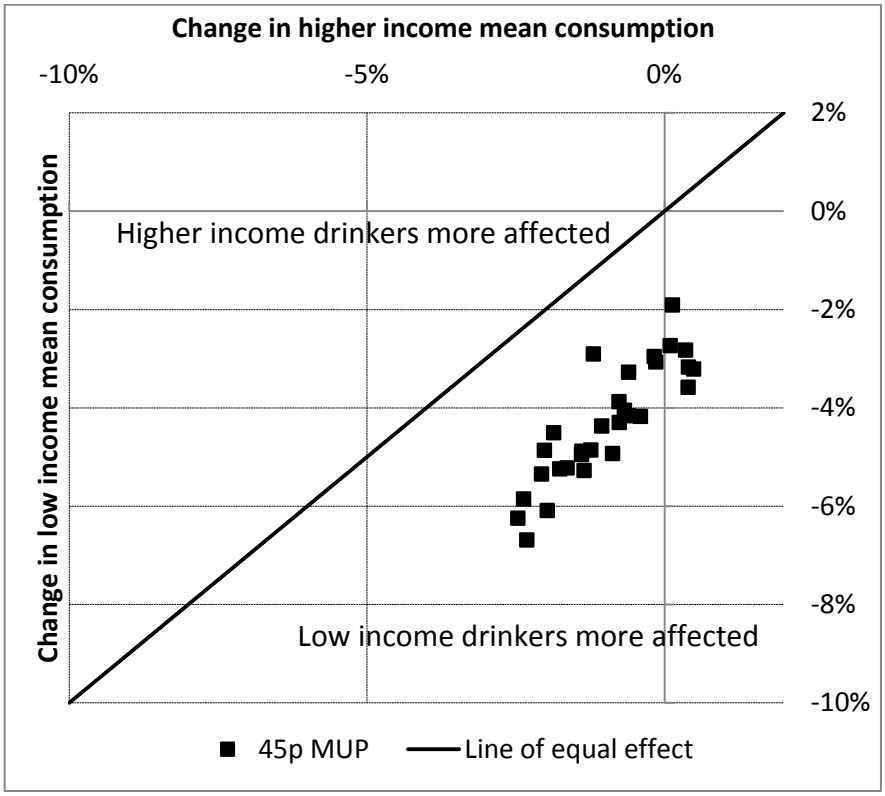

Figure 4-4: Scatter plot of PSA results, showing relative change in consumption for a 45p MUP by low income and higher income groups

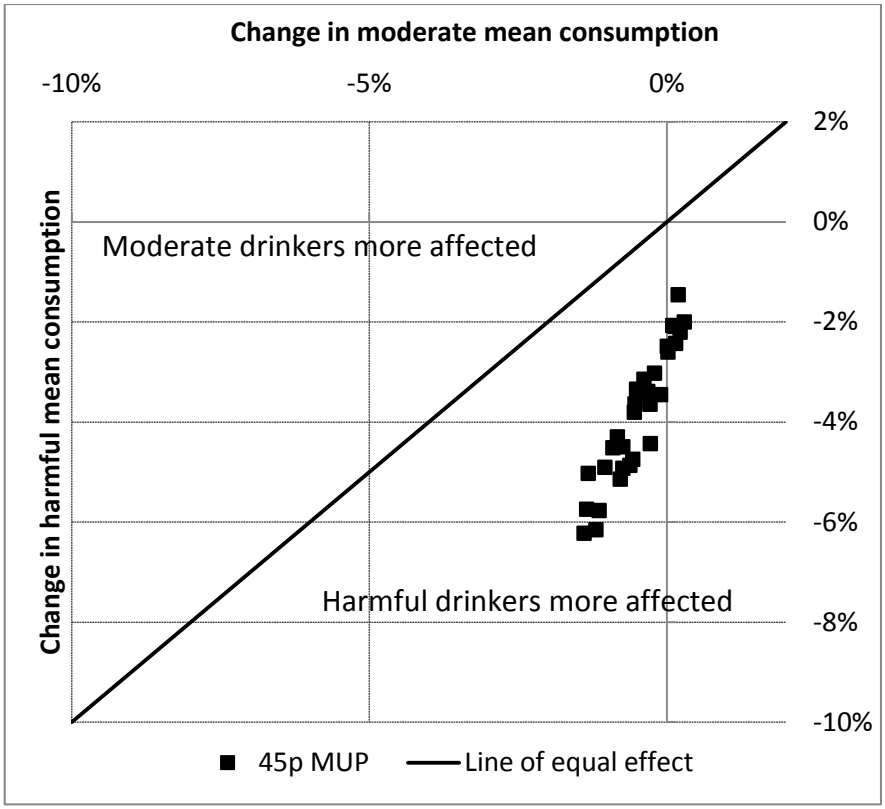

Figure 4-5: Scatter plot of PSA results, showing relative change in consumption for a 45p MUP by moderate and harmful drinkers

Table 4.17 and Figures 4.6 and 4.7 compare the estimated impacts on alcohol consumption of a 45p MUP and a general 10% price increase policy using alternative elasticities as described in Section 3.8.

Table 4.17: Comparison of estimated impacts on alcohol consumption for a 45p MUP and a general 10% increase policy using alternative elasticities

	45p MUP: Alternative elasticities						
	Base case	SA1: No cross-price	SA2: No non-significant	SA3: Income-specific	SA4: Consumption level-specific	SA5: Time series	SA6: HMRC
Population	-1.6%	-2.4%	-2.3%	-1.7%	-3.1%	-1.9%	-2.8%
Low income	-4.3%	-4.5%	-4.4%	-8.6%	-5.3%	-2.9%	-5.1%
Higher income	-0.9%	-1.8%	-1.7%	0.1%	-2.5%	-1.6%	-2.1%
Moderate	-0.6%	-1.0%	-1.0%	-0.7%	-0.4%	-0.5%	-1.3%
Hazardous	-0.7%	-1.7%	-1.7%	-0.5%	-2.8%	-1.6%	-2.1%
Harmful	-3.7%	-4.3%	-4.2%	-4.2%	-5.8%	-3.4%	-4.9%
	10% price increase: Alternative elasticities						
	Base case	SA1: No cross-price	SA2: No non-significant	SA3: Income-specific	SA4: Consumption level-specific	SA5: Time series	SA6: HMRC
Population	-5.0%	-6.0%	-4.8%	-5.0%	-5.1%	-7.4%	-4.3%
Low income	-6.0%	-6.2%	-5.1%	-4.8%	-6.5%	-7.1%	-5.1%
Higher income	-4.7%	-5.9%	-4.7%	-5.0%	-4.7%	-7.5%	-4.1%
Moderate	-4.4%	-6.1%	-4.4%	-4.5%	-3.4%	-7.9%	-4.3%
Hazardous	-4.7%	-5.8%	-4.8%	-4.7%	-5.1%	-7.5%	-4.0%
Harmful	-5.8%	-6.1%	-5.2%	-5.7%	-6.6%	-6.9%	-4.7%

Remarks: SA1: assuming all cross-price elasticities to be zero (i.e. assuming no substitution effects) in the elasticity matrix estimated for the base case. SA2: excluding non-significant elasticities (p-value greater than 0.05) in the elasticity matrix estimated for the base case, SA3: separate low income and higher income specific-elasticity matrices were estimated using the pseudo-panel approach, SA4: separate moderate and hazardous/harmful-specific elasticity matrices were estimated using the pseudo-panel approach, SA5: elasticities were estimated using a time series analysis [30] of national aggregate data on alcohol released for consumption or sale in the UK from 1964 to 2011. SA6: latest elasticities estimated by HMRC in 2012.

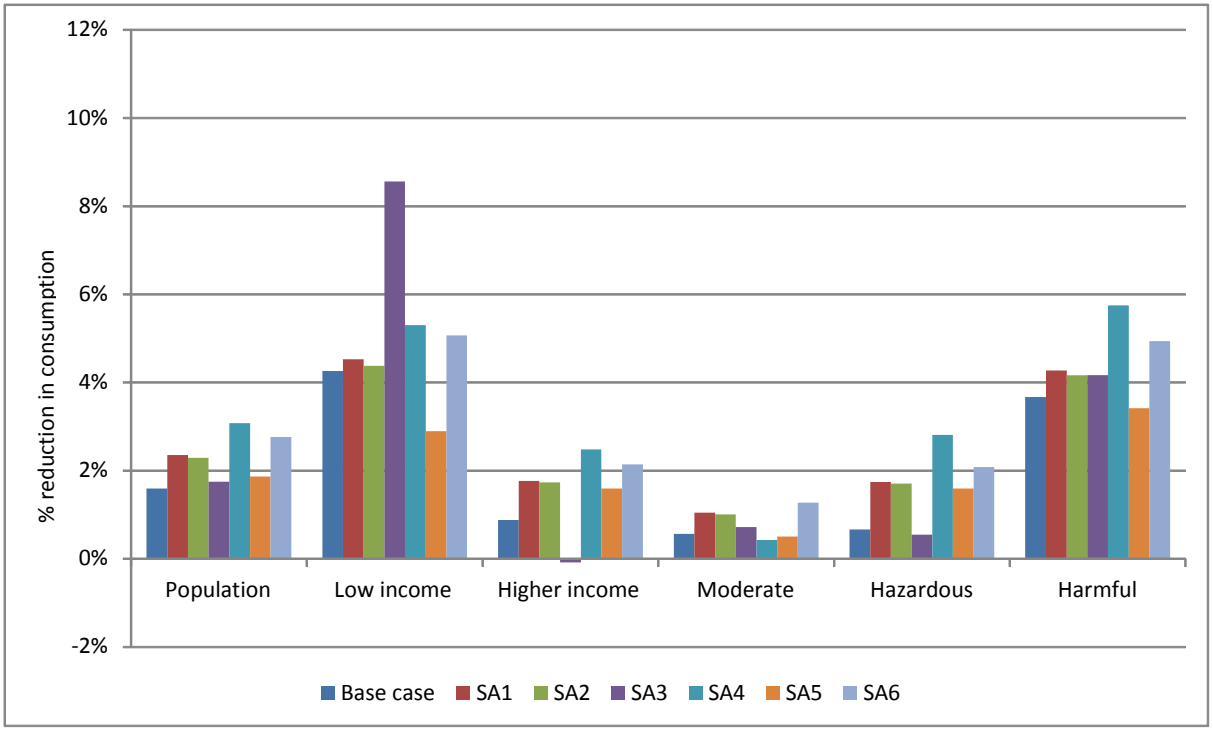

Figure 4-6: Comparison of estimated impacts on alcohol consumption of a 45p MUP policy using alternative elasticities.

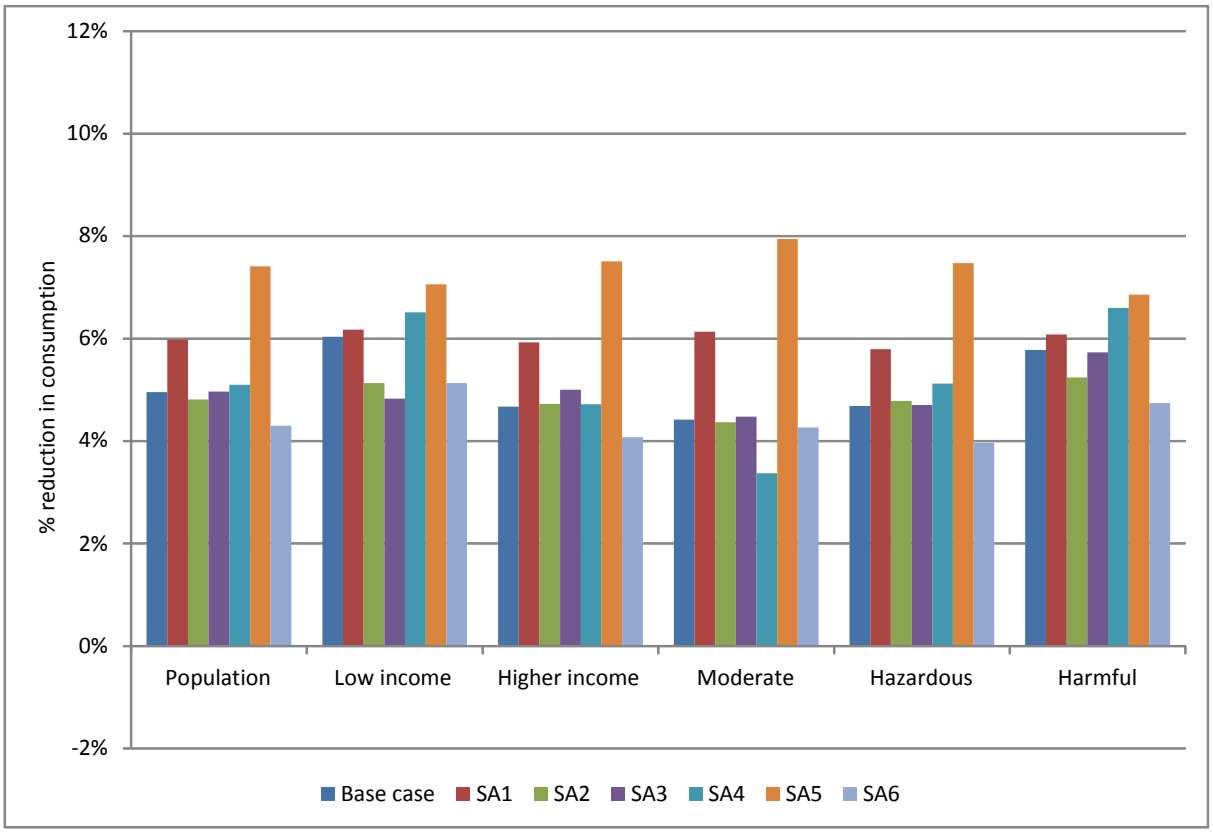

Figure 4-7: Comparison of estimated impacts on alcohol consumption of a 10% price increase policy using alternative elasticities

The results for a 45p MUP suggest that the base case model is the most conservative in terms of estimated scale of impact for the overall population when compared against the other five sensitivity analyses. For example the base case has a reduction in estimated consumption of -1.6% whilst the equivalent estimates for the sensitivity analyses range from -1.7% to -3.1%. The effects of the different sensitivity analyses are not uniform across subgroups. For example SA3 shows larger effects in low income drinkers, while SA4 shows greater impact in hazardous and harmful drinkers. Detailed tables showing estimated impacts of a 45p MUP on consumption and spending for each of the sensitivity analyses are provided in Appendix 7. Table 4.18 compares the estimated impacts on harm reductions of a 45p MUP policy using the alternative elasticities.

Table 4.18: Comparison of estimated impacts on harm reductions for a 45p MUP policy using alternative elasticities

	Year 1			Year 10: Full Effect per year		
	Deaths	Hospital admissions ('000s)	Deaths	Hospital admissions ('000s)	Total Crimes ('000s)	Days Absence ('000's)
Base case	-123	-5.7	-624	-23.7	-34.2	-247.6
SA1: No cross-price	-181	-8.0	-936	-31.2	-33.8	-300.7
SA2: No non-significant	-177	-7.8	-917	-30.5	-32.9	-291.6
SA3: Income-specific	-133	-6.4	-625	-25.5	-34.9	-262.2
SA4: Consumption level-specific	-243	-10.2	-1322	-41.4	-48.2	-380.0
SA5: Time series	-131	-5.6	-790	-25.3	-10.3	-165.8
SA6: HMRC	-213	-9.7	-1058	-36.2	-50.4	-406.2

5 DISCUSSION

The above analyses provide policy appraisals of MUP using version 2.5 of SAPM. Here we present discussion of key differences between the results of these appraisals and those performed using earlier versions of SAPM including discussion of analyses not possible with earlier version of SAPM.

5.1 COMPARISON OF RESULTS BETWEEN SAPM2 AND SAPM2.5

Figure 5.1 presents a comparison of the estimated impacts of different MUP thresholds and a general 10% price increases on alcohol consumption in the general population for versions 2.0 and 2.5 of SAPM. SAPM version 2.0 estimated MUP impacts in 2008 prices [2] whilst version 2.5 uses 2014/15 prices. Therefore, it is expected that each MUP threshold examined has a smaller impact over time as price inflation lifts a greater proportion of products above the price threshold; this demonstrates the importance of ensuring any minimum price set is increased in line with inflation to maintain policy effectiveness.

However, as detailed below, further substantial changes to the structure of SAPM for version 2.5 mean more detailed results (e.g. for specific beverages or harmful outcomes) cannot be directly compared and any differences in findings cannot simply be attributed to trends in the underlying price, consumption and harm data.

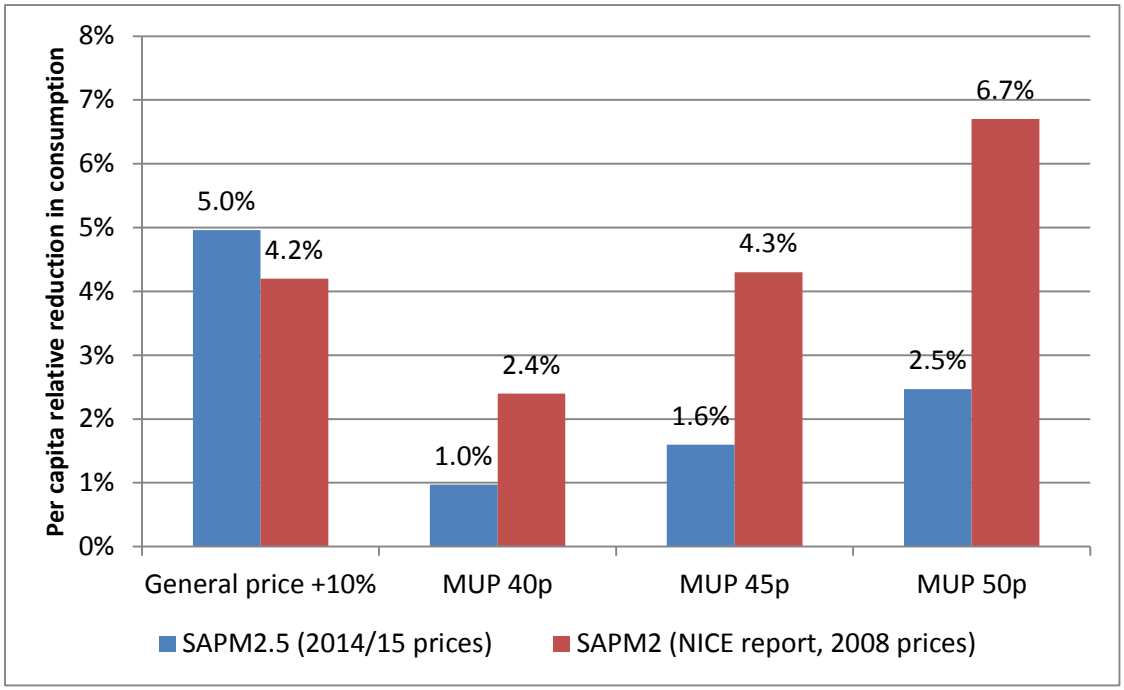

Figure 5-1: Comparison of estimated effects of price policies on population alcohol consumption for different versions of SAPM.

5.2 SUMMARY OF DIFFERENCES BETWEEN SAPM VERSION 2.5 AND PREVIOUS VERSIONS.

Two types of changes have been made to SAPM since version 2.0; these are changes to the methodology or structure of SAPM and updates to the underlying data.

5.2.1 Methodological and structural changes:

- A new econometric model, using a pseudo-panel approach, has been developed to estimate price elasticities of alcohol demand using the LCF data from 2001/2 to 2009.
- For the beverage categories considered in the econometric model and the P2C part of SAPM, cider has been separated from beer. The ten beverage types modelled are now off/on-trade beer, cider, wine, spirits and RTDs. We no longer separate high and low priced products.
- Regarding population subgroups; apart from gender, age and drinking level (moderate/hazardous/harmful), the population is also categorised as low income (below the relative poverty line defined as 60% of median equivalised household income) and higher income. Therefore, income-specific impacts of policy interventions such as MUP can be estimated for alcohol consumption and alcohol-related harms. The model now only focuses on the population aged 16 and over.

5.2.2 Updates to underlying data:

- The LCF data used to provide price model inputs now covers 2001/2 to 2009, whereas it previously ended in 2005/6.
- New consumption data from the GLF 2009 has become available and replaces previous data from 2006.
- The Home Office and NHS Health Scotland have procured market research data on the 2011 price distributions of off-trade and on-trade alcohol in England from The Nielsen Company and CGA Strategy.
- New crime volume and costs data are available for 2011.

5.2.3 Considerations regarding the new econometric model

A key difference between the new econometric model and the one used in SAPM2 is that the cross-price elasticities in the new econometric model are larger and many change from being positive to negative signs. This includes the cross-price elasticities describing the relationship between changes in off-trade prices and on-trade consumption; an important consideration as it means the increases in off-trade prices which would result from a MUP have a greater impact on consumption in the on-trade than in our previous analyses. However, caution is required when interpreting findings substantially influenced by these cross-price elasticities as, although the econometric model as a whole is statistically significant, Table 4.2 shows that few of the cross-price elasticities are individually significant. Therefore, greater confidence can be placed on our estimates of aggregated effects on total alcohol consumption, but there is considerable uncertainty regarding shifts in consumption between individual beverages and between the on-trade and off-trade.

Although the new econometric model has limitations (report available for download from: http://www.sheffield.ac.uk/scharr/sections/heds/discussion-papers/1313-1.283506), notably the continuing lack of individual-level UK panel data on alcohol purchasing, it addresses several of the limitations identified with the previous model (e.g. using a pseudo-panel to analyse the data longitudinally and by better addressing non-purchasers). Therefore, we consider the new model to provide a more accurate and robust estimate of consumers' price responsiveness across multiple beverage categories in England.

5.2.4 Considerations regarding the disaggregation of cider and beer

The disaggregation of cider from beer in SAPM 2.5 recognises that, due to the large differences in alcohol duty levied on these products, cider can be sold at substantially lower prices and higher strengths than beer. Off-trade cider is also disproportionately purchased by harmful, low income and male consumers relative to the total population. Given these

points, it is unsurprising that Tables 4.11-4.14 show off-trade cider accounts for a substantial proportion of the consumption reduction seen amongst many of the groups most affected by MUPs. Further, as off-trade cider accounts for a sufficiently large proportion of the alcohol spend by 'low-income male harmful drinkers', the high elasticity of this beverage type leads to these consumers' overall spending on alcohol falling under a 45p MUP.

5.2.5 Further issues to be discussed

These above changes to SAPM have led to both new findings and changes to previous findings. In particular, we are able to provide estimates of the impacts of MUP by income group. We also see significant differences in estimated MUP impacts on crimes and on retailer revenues. These three areas are discussed in turn below before briefly describing further work to be carried out.

5.3 IMPACTS ON LOW AND HIGHER INCOME GROUPS

The above analyses present the first income-specific results from SAPM and five main findings should be highlighted. First, when interpreting these results, it should be borne in mind that 26.8% of those with low incomes are non-drinkers compared to 11.6% of those with higher incomes and, amongst moderate drinkers, those with low incomes consume 4.5 units per week compared to 5.8 units for those with higher incomes. Therefore, the low income population contains disproportionate numbers of people who will be wholly or largely unaffected by the direct impacts of MUP due to their abstinence or relatively low consumption.

Second, MUP impacts on the consumption of both low and higher income groups; however, it has a greater relative impact on the consumption of low income drinkers. As we assume low and higher income drinkers are equally responsive to price changes when they have the same consumption patterns, this difference in policy impact is due to 1) lower income drinkers tending to buy more products from the cheaper end of the spectrum, and 2) the larger price elasticities of the products favoured by low income drinkers, particularly beer and cider purchased in the off-trade.

Third, the impact of a 45p MUP on some groups is very small in absolute terms. Consumption amongst low income and higher income moderate drinkers respectively would fall by just 3.5 and 1.0 units per year. This compares with 297.0 units for low income harmful drinkers and 85.2 units for higher income harmful drinkers.

Fourth, the impact of a MUP on low income drinkers' spending is smaller overall and within each consumption group than the impact on higher income drinkers' spending. This is because the products favoured by higher income drinkers have smaller price elasticities and thus, although higher income drinkers do reduce their consumption, they are also more likely to increase their spending in response to price increases.

Finally, the greater fall in consumption amongst low income drinkers also leads to greater reductions in alcohol-related health harms within this group. SAPM2.5, as in SAPM2, assumes that the risk functions are identical for low income and higher income population subgroups. This assumption may be relaxed in future versions of the model as we incorporate evidence on differential risks of harm by socioeconomic and income groups [31]. As this evidence tends to show greater risks of harm per unit consumed for lower income or socioeconomic groups, it is likely that current estimates of impacts on health harm underestimate potential reductions in harm for low income groups and overestimate reductions within higher income groups.

In summary, the income-specific analysis of the potential impacts of a 45p MUP suggests that MUP will impact on both low and higher income drinkers and that, within each income group, the impacts on harmful drinkers will be substantial and greater than the impacts on moderate drinkers. A key policy concern is whether low income moderate drinkers are 'penalised' by MUP. Policy impacts on low income moderate drinkers are small in absolute terms, amounting to a consumption reduction of just 3.5 units per year and a spending increase of just £0.30 per year. As moderate consumers make up 83.9% of the low income population and 26.8% of these are abstainers and thus not directly affected by the policy, our estimates suggest only a small minority of those with low incomes will be substantially impacted by MUP and these individuals will tend to consume at hazardous or harmful levels.

5.4 IMPACTS ON REVENUE TO RETAILERS

A key difference in our estimates of policy impact compared to SAPM2 is seen in the estimates of changes in revenue (after VAT and duty) to retailers. SAPM2 found revenue to both off-trade and on-trade retailers would increase by £433m and £316m respectively under a 40p MUP. In SAPM2.5 a 45p MUP (which is the nearest equivalent policy estimated here) is estimated to lead to an increase in revenue for off-trade retailers of £201m (+5.6%) but a decline in revenue to on-trade retailers of £62m (-0.7%).

These changes may seem paradoxical for a policy which almost exclusively affects prices of off-trade products; however, it is the result of two findings embedded within the new econometric analysis described in section 3.2 of this report. First, the relative inelasticity of alcohol means that the average consumer response to alcohol price increases includes paying more as well as buying less, so revenue increases even though consumption falls. Second, the cross-price elasticities in Table 4.2 of this report suggest that when the prices of some off-trade beverages increase, consumption of both on-trade and off-trade beverages decreases. In other words, on-trade and off-trade products are complements between some beverage types rather than substitutes for each other and when off-trade consumption falls, on-trade consumption may also fall.

Caution is required regarding these results due to the lack of statistical significance for many of the cross-price elasticities. The PSA shows that there is a 36.7% chance (11 out of 30 PSA runs) that revenue to on-trade retailers will actually increase under a 45p MUP and the estimated 95% non-parametric confidence interval is -183m to 196m.

It should also be noted that, as with all our estimates, considerable uncertainty exists regarding retailers' responses to the introduction of a MUP. SAPM assumes the only change in pricing that will occur is for all prices of products below the MUP threshold to be raised up to that threshold. In reality, retailers and producers may make a range of additional changes to both prices and products which may impact on resulting revenue changes and other modelled outcomes.

5.5 IMPACTS ON ALCOHOL-RELATED CRIME

SAPM2.5 estimates a 45p MUP would lead to 34,200 fewer crimes per year. This is substantially higher than the equivalent estimate of 10,100 fewer crimes from SAPM2. Identification of the main reasons for this require further analysis, however, they are likely to relate to the changes in the econometric model which mean the alcohol consumed by high risk groups (e.g. young males), is subject to greater impacts from the policy via the cross-price elasticities.

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6 APPENDIX

6.1 APPENDIX 1: RELATIONSHIP BETWEEN PEAK DAILY CONSUMPTION AND MEAN DAILY CONSUMPTION

Table 6.1(i) Statistical regression model: relationship between peak daily consumption and mean daily consumption

Independent variables	Moderate	Hazardous	Harmful
Slope	2.403	0.923	0.435
male aged 18 – 24	1.202	3.909	5.057
male aged 25 – 34	1.772	5.493	0.574
male aged 35 – 44	0.898	3.178	0.914
male aged 45 – 54	0.946	2.448	-0.640
male aged 55 – 64	0.466	0.839	-1.486
male aged 65 – 74	-0.122	-0.736	-3.087
male aged 75 +	-0.637	-1.233	-5.418
female aged 16 – 17	1.174	2.174	5.654
female aged 18 – 24	0.824	4.483	1.889
female aged 25 – 34	1.009	2.815	0.925
female aged 35 – 44	0.705	2.625	-3.159
female aged 45 – 54	0.373	0.893	-3.407
female aged 55 – 64	0.237	-0.140	-4.853
female aged 65 – 74	-0.073	-0.629	-7.382
female aged 75 +	-0.261	-1.646	-8.835
Constant	0.239	2.226	9.088
Adjusted R-squared	0.309	0.150	0.192
Root MSE	2.939	5.381	7.473

6.2 APPENDIX 2: ONS ALCOHOL-SPECIFIC RPIS 2001 TO 2011

Year	Beer on-trade	Beer off-trade	Wine & spirits on-trade	Wine & spirits off-trade
2001	215.6	161.6	203.3	152.3
2002	221.7	160.7	210.6	153.3
2003	228.3	157.8	217.5	153.7
2004	234.9	153.5	223.0	155.0
2005	242.8	148.3	228.5	155.6
2006	251.1	147.8	235.4	156.5
2007	261.0	148.9	243.3	158.4
2008	272.4	149.0	253.1	165.2
2009	281.4	153.6	261.9	173.2
2010	291.8	155.4	271.5	180.4
2011	307.8	163.9	287.2	191.8

Source: Office for National Statistics (2001 to 2011)

6.3 APPENDIX 3: RISK FUNCTIONS FOR HEALTH CONDITIONS

Table 6.3(i): Slope of the linear absolute risk function for mortality for wholly attributable conditions

	11 – 15 years		16 - 17 years		18 - 24 years		25 - 34 years		35 - 44 years		45 - 54 years		55 - 64 years		65 - 74 years		75 + years	
Conditions	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Alcohol-induced pseudo-Cushing's syndrome																		
Mental and behavioural disorders due to use of alcohol	1.7E-07		9.6E-07		2.7E-07		1.7E-06	6.3E-07	6.4E-06	4.6E-06	8.0E-06	9.8E-06	1.4E-05	1.7E-05	1.7E-05	1.0E-05	2.8E-05	2.7E-05
degeneration											4.8E-07		8.7E-07		5.6E-07		5.8E-06	
Alcoholic polyneuropathy											4.8E-07							
Alcoholic myopathy											4.8E-07		8.7E-07					
Alcoholic cardiomyopathy							6.2E-07	7.4E-07	3.4E-06		5.0E-06	2.3E-06	6.7E-06	2.0E-06	8.9E-06	1.6E-06	1.9E-06	3.2E-06
Alcoholic gastritis								7.4E-07			2.4E-07		2.9E-07		5.6E-07			
Alcoholic liver disease					1.1E-06	1.3E-06	2.8E-05	3.5E-05	1.3E-04	1.2E-04	2.2E-04	2.7E-04	2.6E-04	3.0E-04	2.4E-04	3.4E-04	2.7E-04	2.5E-04
Chronic pancreatitis							9.3E-07	7.4E-07	1.0E-06	4.4E-07	3.4E-06	1.7E-06	2.6E-06	1.3E-06	1.7E-06	1.6E-06	3.9E-06	
Ethanol poisoning					9.6E-08			1.3E-07	7.1E-07	2.6E-07	3.5E-07	3.9E-07	5.4E-07	3.1E-07	3.5E-07			
Methanol poisoning									7.9E-08		8.7E-08							
Toxic effect of alcohol, unspecified		4.4E-08		2.5E-07	1.9E-07	1.7E-07	9.3E-07	3.8E-07	1.7E-06	2.0E-06	3.0E-06	2.7E-06	1.7E-06	3.4E-06	2.8E-06	3.4E-06	1.3E-06	
Accidental poisoning by exposure to alcohol		4.4E-08		2.5E-07	2.9E-07	1.7E-07	8.0E-07	6.3E-07	2.3E-06	2.3E-06	3.2E-06	3.1E-06	2.2E-06	3.7E-06	2.8E-06	2.6E-06	1.3E-06	

Table 6.3(ii): Slope of the linear absolute risk function for morbidity for wholly attributable conditions

	11 – 15 years		16 - 17 years		18 - 24 years		25 - 34 years		35 - 44 years		45 - 54 years		55 - 64 years		65 - 74 years		75 + years	
Conditions	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Alcohol-induced pseudo-Cushing's syndrome																		
Mental and behavioural disorders due to use of alcohol	4.4E-04	2.9E-04	2.0E-03	4.8E-04	5.7E-04	3.3E-04	6.7E-04	4.7E-04	1.3E-03	8.2E-04	1.3E-03	1.2E-03	1.7E-03	1.3E-03	2.4E-03	1.8E-03	4.6E-03	4.7E-03
degeneration							3.2E-07	7.7E-07	8.3E-06	7.0E-06	1.8E-05	1.8E-05	2.0E-05	1.9E-05	2.5E-05	1.9E-05	5.0E-05	3.4E-05
Alcoholic polyneuropathy							1.9E-06	3.1E-06	2.5E-06	1.9E-06	6.3E-06	9.2E-06	1.0E-05	5.7E-06	1.2E-05	8.7E-06	2.3E-05	2.1E-05
Alcoholic myopathy									5.5E-07	4.7E-07	2.0E-06	6.1E-07	3.1E-06	7.2E-07	3.0E-06	1.7E-06	8.3E-06	3.4E-06
Alcoholic cardiomyopathy							2.3E-06		1.3E-05	2.8E-06	3.0E-05	5.5E-06	4.9E-05	7.9E-06	6.1E-05	5.2E-06	7.7E-05	3.1E-05
Alcoholic gastritis			5.5E-05	1.8E-05	1.9E-05	1.6E-05	2.9E-05	1.5E-05	3.5E-05	1.8E-05	2.5E-05	1.7E-05	1.7E-05	1.2E-05	1.8E-05	1.6E-05	2.9E-05	1.0E-05
Alcoholic liver disease			1.5E-05	6.0E-06	5.2E-06	5.2E-06	7.6E-05	1.3E-04	3.4E-04	3.2E-04	5.9E-04	7.0E-04	8.0E-04	7.8E-04	8.7E-04	1.1E-03	1.1E-03	9.2E-04
Chronic pancreatitis			3.3E-05	7.2E-06	1.1E-05	6.3E-06	5.0E-05	2.5E-05	9.1E-05	3.8E-05	6.6E-05	4.4E-05	4.5E-05	2.1E-05	3.1E-05	2.9E-05	3.7E-05	1.0E-05
Ethanol poisoning	2.2E-04	2.7E-04	4.4E-04	3.6E-04	1.2E-04	2.5E-04	1.2E-04	2.6E-04	1.4E-04	3.1E-04	7.7E-05	2.6E-04	4.9E-05	1.3E-04	3.6E-05	9.5E-05	6.2E-05	1.2E-04
Methanol poisoning			2.8E-07	4.4E-07	7.9E-08	3.1E-07	2.1E-07	1.3E-07	1.7E-07	5.4E-07	3.7E-07	6.2E-07	1.4E-07				1.3E-06	5.7E-06
Toxic effect of alcohol, unspecified			1.5E-05	1.2E-05	4.3E-06	8.2E-06	3.7E-06	8.3E-06	6.6E-06	1.0E-05	3.3E-06	8.3E-06	1.9E-06	6.6E-06	1.1E-06	4.5E-06	2.7E-06	2.9E-06
Accidental poisoning by exposure to alcohol			2.2E-05	1.1E-05	6.3E-06	7.9E-06	3.9E-06	6.3E-06	4.4E-06	7.3E-06	3.1E-06	6.0E-06	1.9E-06	4.3E-06	3.3E-06	1.8E-06	6.7E-06	2.0E-05

Table 6.3(iii): Slope of the linear risk function for acute conditions partially attributable to alcohol

	16 - 24 years		25 - 34 years		35 - 44 years		45 - 54 years		55 - 64 years		65 - 74 years		75 + years	
	M	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Road traffic accidents - non pediastrian	0.17564	0.07094	0.13789	0.09680	0.18937	0.11580	0.17514	0.14981	0.04146	0.00000	0.07252	0.00000	0.20074	0.00000
Pedestrian traffic accidents	0.66565	0.32315	0.32422	0.12438	0.33560	0.38199	0.31038	0.49419	0.07985	0.06347	0.13968	0.12672	0.38662	0.44045
Water transport accidents	0.07477	0.08079	0.05869	0.11025	0.08061	0.13188	0.07455	0.17061	0.10480	0.24858	0.18333	0.49634	0.50743	1.72511
Air/space transport accidents	0.05696	0.06155	0.04472	0.08400	0.06142	0.10048	0.05680	0.12999	0.07985	0.18940	0.13968	0.37816	0.38662	1.31437
Fall injuries	0.08435	0.05261	0.06622	0.07179	0.09095	0.08587	0.08411	0.11110	0.11823	0.16187	0.10000	0.08272	0.27678	0.28752
Work/machine injuries	0.02251	0.02432	0.01767	0.03319	0.02427	0.03971	0.02245	0.05137	0.03155	0.07484	0.05520	0.14943	0.15278	0.51939
Firearm injuries	0.09969	0.10772	0.07826	0.14700	0.10748	0.17584	0.09940	0.22748	0.13973	0.33144	0.24444	0.66178	0.67658	2.30015
Drowning	0.15406	0.16647	0.12095	0.22718	0.16611	0.27175	0.15362	0.35156	0.21594	0.51223	0.37776	1.02275	1.04562	3.55478
Inhalation of gastric contents	0.09969	0.10772	0.07826	0.14700	0.10748	0.17584	0.09940	0.22748	0.13973	0.33144	0.24444	0.66178	0.67658	2.30015
Fire injuries	0.18330	0.19806	0.14390	0.27028	0.19763	0.32331	0.18277	0.41827	0.25692	0.60943	0.44945	1.21682	1.24403	4.22931
Accidental excessive cold	0.09969	0.10772	0.07826	0.14700	0.10748	0.17584	0.09940	0.22748	0.13973	0.33144	0.24444	0.66178	0.67658	2.30015
Intentional self-harm	0.15406	0.17400	0.12095	0.21720	0.17362	0.27175	0.17514	0.35156	0.23579	0.46792	0.32946	0.66178	0.75072	1.72511
Assault	0.11061	0.11952	0.08684	0.16311	0.11926	0.19511	0.11030	0.25241	0.15504	0.36777	0.27122	0.73430	0.75072	2.55222

6.4 APPENDIX 4: SLOPE OF RELATIVE RISK FUNCTIONS, SPLIT BY OFFENCE CATEGORY AND OCJS GENDER AND AGE SUB-GROUPS

		Male		Female	
Offences	**AAF used**	**Under 16 years old**	**16 years and over**	**Under 16 years old**	**16 years and over**
More serious wounding	Assault with Injury	0	0.038099084	0.009594672	0.127546864
Less serious wounding	Assault with Injury	0	0.038099084	0.009594672	0.127546864
Assault on a constable	Assault without Injury	0	0.065647526	0.006935395	0.055689177
Assault without injury	Assault without Injury	0	0.065647526	0.006935395	0.055689177
Criminal damage	Criminal damage	0.019417005	0.134989795	0.108638568	0.167213547
Theft from the person	Other theft	0.028534668	0.004246302	0.016387841	0.004256265
Robbery	Other theft	0.028534668	0.004246302	0.016387841	0.004256265
Robbery (Business)	Other theft	0.028534668	0.004246302	0.016387841	0.004256265
Burglary in a dwelling	Other theft	0.028534668	0.004246302	0.016387841	0.004256265
Burglary not in a dwelling	Other theft	0.028534668	0.004246302	0.016387841	0.004256265
Theft of a pedal cycle	Other theft	0.028534668	0.004246302	0.016387841	0.004256265
Theft from vehicle	Vehicle related thefts	0	0.016737308	0.637131033	0.341766515
Aggravated vehicle taking	Vehicle related thefts	0	0.016737308	0.637131033	0.341766515
Theft of vehicle	Vehicle related thefts	0	0.016737308	0.637131033	0.341766515
Other theft	Other theft	0.028534668	0.004246302	0.016387841	0.004256265
Theft from shops	Other theft	0.028534668	0.004246302	0.016387841	0.004256265
Violent disorder	All violent offences	0	0.050717939	0.008260967	0.086938499
Total sexual offence	All violent offences	0	0.050717939	0.008260967	0.086938499
Homicide	All violent offences	0	0.050717939	0.008260967	0.086938499

6.5 APPENDIX 5: SLOPE FOR RELATIVE RISK FUNCTIONS FOR ABSENTEEISM, SPLIT BY GENDER AND AGE GROUP

Age (years)	Absenteeism	
	Male	Female
16 – 17	0.104835	0.067310
18 – 24	0.041767	0.035391
25 – 34	0.035704	0.032175
35 – 44	0.029607	0.022266
45 – 54	0.019271	0.015566
55 – 64	0.014889	0.001793

6.6 APPENDIX 6: ALTERNATIVE ELASTICITY MATRICES USED IN SENSITIVITY ANALYSES

Table 6.6(i): Estimated own- and cross-price elasticities of off- and –on trade beer, cider, wine, spirits and RTDs in the UK (excluding cross-price elasticities)

		Purchase									
		Off-beer	Off-cider	Off-wine	Off-spirits	Off-RTDs	On-beer	On-cider	On-wine	On-spirits	On-RTDs
Price	Off-beer	-0.980*									
	Off-cider		-1.268*								
	Off-wine			-0.384*							
	Off-spirits				-0.082						
	Off-RTDs					-0.585*					
	On-beer						-0.786*				
	On-cider							-0.591*			
	On-wine								-0.871*		
	On-spirits									-0.890*	
	On-RTDs										-0.187

Remarks *: p-value <0.05

Table 6.6(ii): Estimated own- and cross-price elasticities of off- and –on trade beer, cider, wine, spirits and RTDs in the UK (excluding non-significant elasticities)

		Purchase									
		Off-beer	Off-cider	Off-wine	Off-spirits	Off-RTDs	On-beer	On-cider	On-wine	On-spirits	On-RTDs
Price	Off-beer	-0.980*									
	Off-cider		-1.268*								
	Off-wine		0.736*	-0.384*							
	Off-spirits										
	Off-RTDs					-0.585*				-0.179*	
	On-beer						-0.786*		1.042*	1.169*	
	On-cider							-0.591*		0.237*	
	On-wine								-0.871*		
	On-spirits									-0.890*	0.809*
	On-RTDs										

Remarks *: p-value <0.05

Table 6.6(iii): Estimated own- and cross-price elasticities of off- and –on trade beer, cider, wine, spirits and RTDs in the UK for moderate drinkers

		Purchase									
		Off-beer	Off-cider	Off-wine	Off-spirits	Off-RTDs	On-beer	On-cider	On-wine	On-spirits	On-RTDs
Price	Off-beer	-0.439*	-0.353	0.324	-0.133	-0.611	-0.153	-0.493	0.290	-0.452	0.165
	Off-cider	-0.015	-0.677*	0.092	-0.066	-0.296	-0.036	0.126	0.132	-0.187	0.031
	Off-wine	-0.093	0.208	-0.418*	-0.455	0.270	-0.066	-0.217	-0.063	-0.051	0.327
	Off-spirits	-0.013	-0.193	0.066	-0.296*	0.416*	0.041	0.014	-0.010	0.014	0.084
	Off-RTDs	-0.099	-0.110	-0.080	0.421*	-0.355*	-0.131*	0.368*	-0.064	-0.048	-0.056
	On-beer	0.364	-0.933	-0.080	0.100	0.006	-0.380	-0.388	0.108	0.660	-0.214
	On-cider	-0.205	-0.408*	-0.176	-0.104	0.399	0.001	-0.484*	-0.176	-0.008	-0.093
	On-wine	0.133	0.043	0.315*	0.202	0.347	-0.073	0.053	-0.213	-0.162	-0.341
	On-spirits	-0.242	0.164	-0.046	0.268	0.116	-0.020	-0.030	0.309*	-0.183	0.154
	On-RTDs	-0.125	0.064	0.046	-0.330	0.654*	0.145	0.004	0.063	-0.163	0.229

Remarks *: p-value <0.05

Table 6.6(iv): Estimated own- and cross-price elasticities of off- and –on trade beer, cider, wine, spirits and RTDs in the UK for hazardous and harmful drinkers

		Purchase									
		Off-beer	Off-cider	Off-wine	Off-spirits	Off-RTDs	On-beer	On-cider	On-wine	On-spirits	On-RTDs
Price	Off-beer	-1.094*	-0.120	-0.141	-0.085	-0.409	-0.058	1.638	0.164	0.818*	0.313
	Off-cider	0.006	-1.222*	-0.038	0.033	-0.131	-0.139	-0.382	0.047	-0.339	0.237
	Off-wine	0.443*	0.907	0.358	-0.128	1.508*	-0.272	0.463	0.273	-0.801	-0.523
	Off-spirits	-0.075	-0.165	-0.028	0.048	0.533	0.046	0.304	-0.134	0.127	-0.269
	Off-RTDs	-0.056	-0.180	0.043	0.030	-0.889*	0.064	0.033	0.035	-0.019	0.369
	On-beer	0.045	-0.621	-0.063	-0.246	0.321	-0.833*	1.049	0.263	0.816	-1.405
	On-cider	-0.054	0.268	-0.034	-0.121	0.078	0.019	-0.462	-0.031	0.384*	0.232
	On-wine	-0.102	0.243	0.048	-0.038	-1.055*	-0.067	0.321	0.052	0.539*	0.510
	On-spirits	-0.169	-0.540	-0.010	-0.199	-0.247	-0.385*	-0.479	0.009	-1.102*	0.563*
	On-RTDs	0.072	-0.155	-0.101	0.069	-0.366	-0.047	-0.395	0.049	-0.128	-0.800*

Remarks *: p-value <0.05

Table 6.6(v): Estimated own- and cross-price elasticities of off- and –on trade beer, cider, wine, spirits and RTDs in the UK for low income population

		Purchase									
		Off-beer	Off-cider	Off-wine	Off-spirits	Off-RTDs	On-beer	On-cider	On-wine	On-spirits	On-RTDs
Price	Off-beer	-0.883*	-0.443	-0.350	-0.186	-2.677*	-0.306	-1.011	-0.820*	-1.245*	0.594
	Off-cider	0.191	-1.751*	0.024	-0.361	-0.588	-0.050	0.085	-0.117	-0.290	-0.523*
	Off-wine	-0.094	0.483	-0.472	-0.111	0.449	0.037	-0.851	0.436*	-0.778	0.210
	Off-spirits	-0.024	0.480	0.335	-0.256	0.868	0.307*	1.057*	0.079	0.310	-0.093
	Off-RTDs	-0.032	-0.416*	0.009	-0.062	0.204	-0.081	0.293	0.021	-0.133	-0.036
	On-beer	0.041	-0.311	0.865*	-0.703	1.456	-0.504	3.785*	0.903	1.698*	-3.893*
	On-cider	-0.169	0.311	0.008	0.223	-0.625	0.242	0.611	-0.208	0.057	0.058
	On-wine	-0.311	-0.427	0.080	-0.405	0.773	0.006	-1.129	-0.664*	1.021	0.088
	On-spirits	0.111	0.295	0.029	-0.152	1.176	0.166	0.063	0.324	-1.108*	1.126*
	On-RTDs	0.223	0.241	-0.014	-0.305	-0.532	0.187	-0.081	0.373*	0.382	0.543

Remarks *: p-value <0.05

Table 6.6(vi): Estimated own- and cross-price elasticities of off- and –on trade beer, cider, wine, spirits and RTDs in the UK for higher income population

		Purchase									
		Off-beer	Off-cider	Off-wine	Off-spirits	Off-RTDs	On-beer	On-cider	On-wine	On-spirits	On-RTDs
Price	Off-beer	-0.914*	-0.033	0.194	-0.448	-0.923	0.044	0.110	0.419	0.311	0.673
	Off-cider	0.046	-1.217*	0.170	-0.079	-0.159	-0.060	0.085	0.093	-0.140	-0.178
	Off-wine	-0.017	0.775	-0.417*	0.359	-0.138	-0.331	-0.020	-0.097	-0.085	0.019
	Off-spirits	0.129	-0.046	0.133	0.098	-0.077	0.142	0.312	0.096	0.061	0.341
	Off-RTDs	-0.024	-0.110	0.004	0.086	-0.730*	-0.058	-0.018	0.058	-0.202	0.180
	On-beer	0.157	-0.317	0.024	0.050	0.694	-0.897*	0.563	0.908*	1.079*	0.297
	On-cider	-0.117	0.041	0.045	-0.001	0.367	0.031	-0.797*	0.091	0.232	0.245
	On-wine	-0.188	0.183	-0.203	-0.021	-0.045	-0.275	0.053	-0.858*	-0.105	-0.288
	On-spirits	0.025	-0.212	-0.036	-0.347	-0.386	-0.039	-0.499	0.057	-0.783*	0.898*
	On-RTDs	0.033	-0.104	-0.113	0.021	0.429	0.094	-0.510	-0.073	-0.172	-0.236

Remarks *: p-value <0.05

Table 6.6(vii): Estimated own- and cross-price elasticities of off- and –on trade beer, wine and spirits in the UK using time series data from 1964 to 2011

		Purchase					
		Beer-On	Beer-Off	Spirits-On	Spirits-Off	Wine-On	Wine-Off
Price	Beer-On	-0.28	0.31*	-1.98**	-0.39	-0.13	-0.08
	Beer-Off	0.06	-0.93**	0.79**	-0.28	0.80*	-0.07
	Spirits-On	-0.59**	-0.58**	-1.20**	0.05	-2.07**	-0.28**
	Spirits-Off	0.81**	-0.43**	-0.54	-0.91**	-0.05	-1.04**
	Wine-On	0.00	0.08	0.40**	-0.21	-0.30	0.00
	Wine-Off	-0.09	0.76**	0.33	0.73	0.99	0.64**

Remarks *: p-value <0.05; **: p-value<0.01. Time series data is not available for cider and RTDs, therefore elasticities were only estimated for beer, wine and spirits.

Table 6.6(viii): Own- and cross-price elasticities of off- and –on trade beer, cider, wine, spirits and RTDs used in SAPM2.5 based on elasticities estimated in Table A4.5

		Purchase									
		Off-beer	Off-cider	Off-wine	Off-spirits	Off-RTDs	On-beer	On-cider	On-wine	On-spirits	On-RTDs
Price	Off-beer	-0.93	0.00	-0.08	-0.28	0.00	0.06	0.00	-0.13	0.79	0.00
	Off-cider	0.00	-0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Off-wine	0.76	0.00	0.64	0.73	0.00	-0.09	0.00	0.99	0.33	0.00
	Off-spirit	-0.43	0.00	-1.04	-0.91	0.00	0.81	0.00	-0.05	-0.54	0.00
	Off-RTDs	0.00	0.00	0.00	0.00	-0.91	0.00	0.00	0.00	0.00	0.00
	On-beer	0.31	0.00	-0.08	-0.39	0.00	-0.28	0.00	-0.13	-1.98	0.00
	On-cider	0.00	0.00	0.00	0.00	0.00	0.00	-0.28	0.00	0.00	0.00
	On-wine	0.08	0.00	0.00	-0.21	0.00	0.00	0.00	-0.30	0.40	0.00
	On-spirit	-0.58	0.00	-0.28	0.05	0.00	-0.59	0.00	-2.07	-1.20	0.00
	On-RTDs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.20

Table 6.6(ix): Own- and cross-price elasticities of off- and –on trade beer, cider, wine, spirits and RTDs used in SAPM2.5 based on elasticities estimated by HMRC in 2012

		Purchase									
		Off-beer	Off-cider	Off-wine	Off-spirits	Off-RTDs	On-beer	On-cider	On-wine	On-spirits	On-RTDs
Price	Off-beer	-1.07	-0.08	-0.02	0.02	-0.03	-0.17	0.03	-0.08	-0.07	-0.01
	Off-cider	-0.01	-1.13	0.02	-0.03	0.02	-0.01	-0.20	0.08	-0.10	-0.19
	Off-wine	0.05	0.14	-0.22	-0.01	0.18	-0.01	-0.02	0.08	-0.08	0.04
	Off-spirit	-0.02	-0.01	0.02	-0.41	0.01	-0.06	-0.10	0.01	-0.08	-0.01
	Off-RTDs	0.01	0.01	0.02	0.02	-0.57	0.01	0.05	0.07	0.03	0.17
	On-beer	0.07	0.06	0.09	0.04	-0.02	-0.44	0.00	0.09	0.37	0.06
	On-cider	0.04	-0.07	0.00	0.04	0.13	0.02	-0.28	-0.06	-0.10	-0.04
	On-wine	0.03	0.06	0.03	0.04	0.08	-0.02	-0.08	-0.24	0.09	-0.02
	On-spirit	-0.03	-0.01	0.06	0.00	-0.02	-0.13	-0.01	0.01	-1.01	-0.01
	On-RTDs	-0.05	-0.08	0.02	0.01	0.23	-0.09	0.05	0.20	-0.12	-0.18

6.7 APPENDIX 7: DETAILED RESULTS TABLE FOR 45P MUP (CONSUMPTION EFFECTS) FOR SENSITIVITY ANALYSES

Table 6.7(i): Detailed results table for 45p MUP (consumption effects) – exclusion of cross-price elasticities (SA1)

	Population	Moderate	Hazardous	Harmful	Low income	Higher income	16-17	18-24 Hazardous
Baseline statistics								
Baseline Consumption (units per week)	11.9	4.3	27.2	71.4	9.3	12.9	7.8	27.6
Population	41,393,296	31,964,234	7,232,457	2,196,605	11,224,815	30,168,481	1,041,951	655,712
Baseline Consumption (drinker)	14.1	5.5	27.2	71.4	12.7	14.6	11.0	27.6
Drinker population	34,889,490	25,460,428	7,232,457	2,196,605	8,213,926	26,675,564	738,841	655,712
% drinkers	84.3%	79.7%	100.0%	100.0%	73.2%	88.4%	70.9%	100.0%
% binge (>8 male, >6 female)	21.7%	11.4%	49.4%	79.4%	14.8%	24.2%	16.3%	70.8%
Mean binge if binge occurs	12.1	10.2	12.4	15.1	12.7	12.0	12.5	14.6
Sales/Consumption volume, units per drinker per year								
Off-beer	96.8	29.6	169.6	636.0	113.5	91.6	40.0	128.1
Off-cider	18.9	4.8	24.8	162.6	33.4	14.4	24.9	17.1
Off-wine	264.5	92.1	584.2	1,210.0	175.1	292.0	86.1	184.6
Off-spirits	71.1	27.2	128.1	392.3	93.3	64.3	23.6	157.9
Off-RTDs	7.8	2.1	8.7	71.7	10.1	7.2	16.4	18.7
On-beer	199.4	80.2	371.4	1,014.7	187.7	203.0	163.2	555.0
On-cider	7.7	3.2	13.2	42.5	6.6	8.1	11.0	34.7
On-wine	37.9	26.8	68.0	68.3	15.5	44.8	27.0	57.8
On-spirits	19.8	14.2	31.6	46.0	14.9	21.3	62.8	160.3
On-RTDs	12.3	4.5	19.6	78.0	11.5	12.5	118.9	124.7
Total	**736.2**	**284.5**	**1,419.3**	**3,722.1**	**661.6**	**759.1**	**573.9**	**1,438.9**
Spending, per drinker per year (£)								
Off-beer	43.08	14.54	76.51	263.83	48.64	41.37	12.33	56.01
Off-cider	7.03	2.14	9.81	54.58	11.23	5.74	10.88	7.11
Off-wine	143.16	51.74	314.08	639.95	83.73	161.46	4.49	97.34
Off-spirits	34.60	14.23	61.86	180.91	42.90	32.04	2.50	74.69
Off-RTDs	6.05	1.99	7.07	49.67	7.46	5.61	2.36	19.92
On-beer	246.57	104.80	455.97	1,200.37	212.72	257.00	179.67	698.52
On-cider	9.27	3.98	15.98	48.53	6.80	10.04	5.60	41.23
On-wine	52.04	37.19	91.73	93.57	17.93	62.54	24.06	77.08
On-spirits	48.34	36.23	74.68	102.05	33.04	53.05	128.78	368.00
On-RTDs	22.15	8.58	34.87	137.60	18.93	23.14	188.48	226.85
Total	**612.30**	**275.43**	**1,142.56**	**2,771.06**	**483.38**	**652.00**	**559.15**	**1,666.74**
After intervention / Change from baseline								
Changes in consumption (units per week)	-0.28	-0.05	-0.48	-3.05	-0.42	-0.23	-0.07	-0.31
Changes in consumption (drinker)	-0.33	-0.06	-0.48	-3.05	-0.57	-0.26	-0.09	-0.31
Changes in consumption (%)	**-2.4%**	**-1.0%**	**-1.7%**	**-4.3%**	**-4.5%**	**-1.8%**	**-0.8%**	**-1.1%**
Final Consumption (drinker)	13.8	5.4	26.7	68.3	12.1	14.3	10.9	27.3
Absolute change in sales/Consumption volume, units per drinker per year								
Off-beer	-7.4	-1.1	-11.7	-66.7	-9.8	-6.7	-2.0	-9.3
Off-cider	-7.3	-1.0	-8.2	-76.8	-16.8	-4.3	-2.6	-3.7
Off-wine	-2.4	-0.8	-4.5	-14.1	-3.0	-2.2	-0.1	-2.3
Off-spirits	-0.2	-0.1	-0.3	-1.3	-0.3	-0.1	0.0	-0.5
Off-RTDs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-beer	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1
On-cider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-wine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-spirits	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-RTDs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**-17.3**	**-3.0**	**-24.8**	**-159.0**	**-30.0**	**-13.4**	**-4.8**	**-16.0**
Absolute change in spending, per drinker per year (£)								
Off-beer	-0.23	-0.01	-0.28	-2.52	-0.32	-0.20	-0.07	-0.23
Off-cider	-1.41	-0.17	-1.56	-15.22	-3.44	-0.78	-0.47	-0.60
Off-wine	1.98	0.66	3.77	11.27	2.20	1.91	0.08	1.80
Off-spirits	0.99	0.32	1.67	6.52	1.57	0.81	0.05	2.67
Off-RTDs	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
On-beer	0.00	0.00	0.01	0.02	0.01	0.00	0.01	0.02
On-cider	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-wine	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
On-spirits	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-RTDs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1.33**	**0.79**	**3.60**	**0.08**	**0.02**	**1.74**	**-0.40**	**3.68**
Relative change in spending	**0.2%**	**0.3%**	**0.3%**	**0.0%**	**0.0%**	**0.3%**	**-0.1%**	**0.2%**

Table 6.7(ii): Detailed results table for 45p MUP (consumption effects) – exclusion of non-significant elasticities (SA2)

	Population	Moderate	Hazardous	Harmful	Low income	Higher income	16-17	18-24 Hazardous
Baseline statistics								
Baseline Consumption (units per week)	11.9	4.3	27.2	71.4	9.3	12.9	7.8	27.6
Population	41,393,296	31,964,234	7,232,457	2,196,605	11,224,815	30,168,481	1,041,951	655,712
Baseline Consumption (drinker)	14.1	5.5	27.2	71.4	12.7	14.6	11.0	27.6
Drinker population	34,889,490	25,460,428	7,232,457	2,196,605	8,213,926	26,675,564	738,841	655,712
% drinkers	84.3%	79.7%	100.0%	100.0%	73.2%	88.4%	70.9%	100.0%
% binge (>8 male, >6 female)	21.7%	11.4%	49.4%	79.4%	14.8%	24.2%	16.3%	70.8%
Mean binge if binge occurs	12.1	10.2	12.4	15.1	12.7	12.0	12.5	14.6
Sales/Consumption volume, units per drinker per year								
Off-beer	96.8	29.6	169.6	636.0	113.5	91.6	40.0	128.1
Off-cider	18.9	4.8	24.8	162.6	33.4	14.4	24.9	17.1
Off-wine	264.5	92.1	584.2	1,210.0	175.1	292.0	86.1	184.6
Off-spirits	71.1	27.2	128.1	392.3	93.3	64.3	23.6	157.9
Off-RTDs	7.8	2.1	8.7	71.7	10.1	7.2	16.4	18.7
On-beer	199.4	80.2	371.4	1,014.7	187.7	203.0	163.2	555.0
On-cider	7.7	3.2	13.2	42.5	6.6	8.1	11.0	34.7
On-wine	37.9	26.8	68.0	68.3	15.5	44.8	27.0	57.8
On-spirits	19.8	14.2	31.6	46.0	14.9	21.3	62.8	160.3
On-RTDs	12.3	4.5	19.6	78.0	11.5	12.5	118.9	124.7
Total	**736.2**	**284.5**	**1,419.3**	**3,722.1**	**661.6**	**759.1**	**573.9**	**1,438.9**
Spending, per drinker per year (£)								
Off-beer	43.08	14.54	76.51	263.83	48.64	41.37	12.33	56.01
Off-cider	7.03	2.14	9.81	54.58	11.23	5.74	10.88	7.11
Off-wine	143.16	51.74	314.08	639.95	83.73	161.46	4.49	97.34
Off-spirits	34.60	14.23	61.86	180.91	42.90	32.04	2.50	74.69
Off-RTDs	6.05	1.99	7.07	49.67	7.46	5.61	2.36	19.92
On-beer	246.57	104.80	455.97	1,200.37	212.72	257.00	179.67	698.52
On-cider	9.27	3.98	15.98	48.53	6.80	10.04	5.60	41.23
On-wine	52.04	37.19	91.73	93.57	17.93	62.54	24.06	77.08
On-spirits	48.34	36.23	74.68	102.05	33.04	53.05	128.78	368.00
On-RTDs	22.15	8.58	34.87	137.60	18.93	23.14	188.48	226.85
Total	**612.30**	**275.43**	**1,142.56**	**2,771.06**	**483.38**	**652.00**	**559.15**	**1,666.74**
After intervention / Change from baseline								
Changes in consumption (units per week)	-0.27	-0.04	-0.46	-2.97	-0.41	-0.22	-0.04	-0.29
Changes in consumption (drinker)	-0.32	-0.05	-0.46	-2.97	-0.56	-0.25	-0.05	-0.29
Changes in consumption (%)	**-2.3%**	**-1.0%**	**-1.7%**	**-4.2%**	**-4.4%**	**-1.7%**	**-0.5%**	**-1.1%**
Final Consumption (drinker)	13.8	5.4	26.8	68.4	12.1	14.3	11.0	27.3
Absolute change in sales/Consumption volume, units per drinker per year								
Off-beer	-7.4	-1.1	-11.7	-66.7	-9.8	-6.7	-2.0	-9.3
Off-cider	-7.0	-0.9	-8.0	-74.1	-16.1	-4.2	-0.5	-3.4
Off-wine	-2.4	-0.8	-4.5	-14.1	-3.0	-2.2	-0.1	-2.3
Off-spirits	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Off-RTDs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-beer	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1
On-cider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-wine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-spirits	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-RTDs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**-16.9**	**-2.9**	**-24.2**	**-155.0**	**-29.0**	**-13.1**	**-2.7**	**-15.1**
Absolute change in spending, per drinker per year (£)								
Off-beer	-0.23	-0.01	-0.28	-2.52	-0.32	-0.20	-0.07	-0.23
Off-cider	-1.28	-0.14	-1.43	-13.88	-3.10	-0.71	0.87	-0.45
Off-wine	1.98	0.66	3.77	11.27	2.20	1.91	0.08	1.80
Off-spirits	1.08	0.34	1.82	7.13	1.72	0.88	0.06	2.93
Off-RTDs	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
On-beer	0.00	0.00	0.01	0.02	0.01	0.00	0.01	0.02
On-cider	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-wine	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
On-spirits	0.00	-0.01	0.01	0.00	0.00	-0.01	0.00	0.04
On-RTDs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Total	**1.55**	**0.84**	**3.90**	**2.04**	**0.51**	**1.87**	**0.94**	**4.13**
Relative change in spending	**0.3%**	**0.3%**	**0.3%**	**0.1%**	**0.1%**	**0.3%**	**0.2%**	**0.2%**

Table 6.7(iii): Detailed results table for 45p MUP (consumption effects) – separate elasticities for low and higher income groups (SA3)

	Population	Moderate	Hazardous	Harmful	Low income	Higher income	16-17	18-24 Hazardous
Baseline statistics								
Baseline Consumption (units per week)	11.9	4.3	27.2	71.4	9.3	12.9	7.8	27.6
Population	41,393,296	31,964,234	7,232,457	2,196,605	11,224,815	30,168,481	1,041,951	655,712
Baseline Consumption (drinker)	14.1	5.5	27.2	71.4	12.7	14.6	11.0	27.6
Drinker population	34,889,490	25,460,428	7,232,457	2,196,605	8,213,926	26,675,564	738,841	655,712
% drinkers	84.3%	79.7%	100.0%	100.0%	73.2%	88.4%	70.9%	100.0%
% binge (>8 male, >6 female)	21.7%	11.4%	49.4%	79.4%	14.8%	24.2%	16.3%	70.8%
Mean binge if binge occurs	12.1	10.2	12.4	15.1	12.7	12.0	12.5	14.6
Sales/Consumption volume, units per drinker per year								
Off-beer	96.8	29.6	169.6	636.0	113.5	91.6	40.0	128.1
Off-cider	18.9	4.8	24.8	162.6	33.4	14.4	24.9	17.1
Off-wine	264.5	92.1	584.2	1,210.0	175.1	292.0	86.1	184.6
Off-spirits	71.1	27.2	128.1	392.3	93.3	64.3	23.6	157.9
Off-RTDs	7.8	2.1	8.7	71.7	10.1	7.2	16.4	18.7
On-beer	199.4	80.2	371.4	1,014.7	187.7	203.0	163.2	555.0
On-cider	7.7	3.2	13.2	42.5	6.6	8.1	11.0	34.7
On-wine	37.9	26.8	68.0	68.3	15.5	44.8	27.0	57.8
On-spirits	19.8	14.2	31.6	46.0	14.9	21.3	62.8	160.3
On-RTDs	12.3	4.5	19.6	78.0	11.5	12.5	118.9	124.7
Total	**736.2**	**284.5**	**1,419.3**	**3,722.1**	**661.6**	**759.1**	**573.9**	**1,438.9**
Spending, per drinker per year (£)								
Off-beer	43.08	14.54	76.51	263.83	48.64	41.37	12.33	56.01
Off-cider	7.03	2.14	9.81	54.58	11.23	5.74	10.88	7.11
Off-wine	143.16	51.74	314.08	639.95	83.73	161.46	4.49	97.34
Off-spirits	34.60	14.23	61.86	180.91	42.90	32.04	2.50	74.69
Off-RTDs	6.05	1.99	7.07	49.67	7.46	5.61	2.36	19.92
On-beer	246.57	104.80	455.97	1,200.37	212.72	257.00	179.67	698.52
On-cider	9.27	3.98	15.98	48.53	6.80	10.04	5.60	41.23
On-wine	52.04	37.19	91.73	93.57	17.93	62.54	24.06	77.08
On-spirits	48.34	36.23	74.68	102.05	33.04	53.05	128.78	368.00
On-RTDs	22.15	8.58	34.87	137.60	18.93	23.14	188.48	226.85
Total	**612.30**	**275.43**	**1,142.56**	**2,771.06**	**483.38**	**652.00**	**559.15**	**1,666.74**
After intervention / Change from baseline								
Changes in consumption (units per week)	-0.21	-0.03	-0.15	-2.97	-0.80	0.01	-0.03	-0.48
Changes in consumption (drinker)	-0.25	-0.04	-0.15	-2.97	-1.09	0.01	-0.04	-0.48
Changes in consumption (%)	**-1.7%**	**-0.7%**	**-0.5%**	**-4.2%**	**-8.6%**	**0.1%**	**-0.3%**	**-1.7%**
Final Consumption (drinker)	13.9	5.4	27.1	68.4	11.6	14.6	11.0	27.1
Absolute change in sales/Consumption volume, units per drinker per year								
Off-beer	-4.5	-0.6	-6.9	-42.2	-2.7	-5.1	-1.8	-6.7
Off-cider	-8.5	-1.1	-9.4	-91.8	-23.0	-4.1	-1.1	-4.1
Off-wine	9.3	1.7	21.7	56.4	-5.6	13.8	0.3	5.1
Off-spirits	-5.1	-1.0	-8.4	-40.8	-12.8	-2.7	-0.8	-8.2
Off-RTDs	-1.4	-0.2	-1.6	-14.9	-3.5	-0.8	0.2	-2.7
On-beer	-3.4	-0.9	-5.3	-25.6	-5.0	-2.9	-0.3	-6.4
On-cider	0.2	0.0	0.2	1.3	-0.2	0.3	0.0	0.0
On-wine	1.2	0.6	2.7	3.4	-1.0	1.9	0.1	2.2
On-spirits	-0.7	-0.5	-0.9	-2.9	-2.5	-0.2	0.2	-4.5
On-RTDs	0.1	0.0	0.1	2.0	-0.4	0.3	1.4	0.4
Total	**-12.9**	**-2.0**	**-7.8**	**-155.1**	**-56.7**	**0.6**	**-1.9**	**-24.9**
Absolute change in spending, per drinker per year (£)								
Off-beer	1.14	0.25	1.96	8.76	2.99	0.57	0.02	1.00
Off-cider	-1.95	-0.21	-2.09	-21.71	-6.19	-0.65	0.46	-0.79
Off-wine	8.59	2.11	18.51	51.07	0.92	10.96	0.09	5.88
Off-spirits	-1.37	-0.20	-2.23	-12.15	-4.34	-0.46	0.01	-0.97
Off-RTDs	-1.18	-0.17	-1.24	-12.72	-2.86	-0.67	-0.10	-3.20
On-beer	-4.07	-1.21	-6.25	-29.97	-5.61	-3.60	-0.40	-7.77
On-cider	0.20	0.06	0.28	1.59	-0.24	0.34	-0.03	0.12
On-wine	1.75	0.88	3.73	5.29	-1.19	2.65	0.26	2.99
On-spirits	-1.66	-1.14	-1.95	-6.71	-5.64	-0.44	0.15	-9.69
On-RTDs	0.22	-0.05	0.12	3.71	-0.68	0.50	2.14	0.64
Total	**1.67**	**0.32**	**10.84**	**-12.84**	**-22.83**	**9.22**	**2.60**	**-11.81**
Relative change in spending	**0.00**	**0.00**	**0.01**	**0.00**	**-0.05**	**0.01**	**0.00**	**-0.01**

Table 6.7(iv): Detailed results table for 45p MUP (consumption effects) – separate elasticities for moderate and hazardous/harmful drinkers (SA4)

	Population	Moderate	Hazardous	Harmful	Low income	Higher income	16-17	18-24 Hazardous
Baseline statistics								
Baseline Consumption (units per week)	11.9	4.3	27.2	71.4	9.3	12.9	7.8	27.6
Population	41,393,296	31,964,234	7,232,457	2,196,605	11,224,815	30,168,481	1,041,951	655,712
Baseline Consumption (drinker)	14.1	5.5	27.2	71.4	12.7	14.6	11.0	27.6
Drinker population	34,889,490	25,460,428	7,232,457	2,196,605	8,213,926	26,675,564	738,841	655,712
% drinkers	84.3%	79.7%	100.0%	100.0%	73.2%	88.4%	70.9%	100.0%
% binge (>8 male, >6 female)	21.7%	11.4%	49.4%	79.4%	14.8%	24.2%	16.3%	70.8%
Mean binge if binge occurs	12.1	10.2	12.4	15.1	12.7	12.0	12.5	14.6
Sales/Consumption volume, units per drinker per year								
Off-beer	96.8	29.6	169.6	636.0	113.5	91.6	40.0	128.1
Off-cider	18.9	4.8	24.8	162.6	33.4	14.4	24.9	17.1
Off-wine	264.5	92.1	584.2	1,210.0	175.1	292.0	86.1	184.6
Off-spirits	71.1	27.2	128.1	392.3	93.3	64.3	23.6	157.9
Off-RTDs	7.8	2.1	8.7	71.7	10.1	7.2	16.4	18.7
On-beer	199.4	80.2	371.4	1,014.7	187.7	203.0	163.2	555.0
On-cider	7.7	3.2	13.2	42.5	6.6	8.1	11.0	34.7
On-wine	37.9	26.8	68.0	68.3	15.5	44.8	27.0	57.8
On-spirits	19.8	14.2	31.6	46.0	14.9	21.3	62.8	160.3
On-RTDs	12.3	4.5	19.6	78.0	11.5	12.5	118.9	124.7
Total	**736.2**	**284.5**	**1,419.3**	**3,722.1**	**661.6**	**759.1**	**573.9**	**1,438.9**
Spending, per drinker per year (£)								
Off-beer	43.08	14.54	76.51	263.83	48.64	41.37	12.33	56.01
Off-cider	7.03	2.14	9.81	54.58	11.23	5.74	10.88	7.11
Off-wine	143.16	51.74	314.08	639.95	83.73	161.46	4.49	97.34
Off-spirits	34.60	14.23	61.86	180.91	42.90	32.04	2.50	74.69
Off-RTDs	6.05	1.99	7.07	49.67	7.46	5.61	2.36	19.92
On-beer	246.57	104.80	455.97	1,200.37	212.72	257.00	179.67	698.52
On-cider	9.27	3.98	15.98	48.53	6.80	10.04	5.60	41.23
On-wine	52.04	37.19	91.73	93.57	17.93	62.54	24.06	77.08
On-spirits	48.34	36.23	74.68	102.05	33.04	53.05	128.78	368.00
On-RTDs	22.15	8.58	34.87	137.60	18.93	23.14	188.48	226.85
Total	**612.30**	**275.43**	**1,142.56**	**2,771.06**	**483.38**	**652.00**	**559.15**	**1,666.74**
After intervention / Change from baseline								
Changes in consumption (units per week)	-0.37	-0.02	-0.77	-4.10	-0.49	-0.32	-0.01	-0.50
Changes in consumption (drinker)	-0.43	-0.02	-0.77	-4.10	-0.67	-0.36	-0.01	-0.50
Changes in consumption (%)	**-3.1%**	**-0.4%**	**-2.8%**	**-5.8%**	**-5.3%**	**-2.5%**	**-0.1%**	**-1.8%**
Final Consumption (drinker)	13.7	5.4	26.5	67.3	12.0	14.2	11.0	27.1
Absolute change in sales/Consumption volume, units per drinker per year								
Off-beer	-7.1	-0.7	-11.8	-66.8	-8.9	-6.6	-1.6	-9.3
Off-cider	-6.6	-0.6	-7.8	-72.2	-15.3	-3.9	-0.3	-3.4
Off-wine	-1.6	1.8	-7.5	-21.0	-0.5	-1.9	-0.2	-1.2
Off-spirits	-0.7	-0.9	0.0	-0.4	-1.2	-0.5	-0.2	-0.3
Off-RTDs	0.0	-0.1	0.0	0.4	0.1	-0.1	0.9	0.4
On-beer	-7.7	-1.0	-15.0	-61.1	-9.5	-7.2	-1.2	-17.2
On-cider	0.4	0.0	0.6	3.7	0.3	0.4	0.2	2.7
On-wine	1.1	0.8	1.6	2.3	0.5	1.2	0.1	1.3
On-spirits	-0.7	-0.6	-0.7	-2.3	-0.9	-0.7	1.0	-4.7
On-RTDs	0.4	0.1	0.8	3.4	0.3	0.5	0.6	5.6
Total	**-22.6**	**-1.2**	**-39.9**	**-214.0**	**-35.1**	**-18.8**	**-0.7**	**-26.1**
Absolute change in spending, per drinker per year (£)								
Off-beer	-0.07	0.23	-0.34	-2.62	0.09	-0.12	0.09	-0.21
Off-cider	-1.08	0.03	-1.37	-13.03	-2.71	-0.58	1.02	-0.45
Off-wine	2.43	2.13	2.07	7.14	3.42	2.13	0.12	2.31
Off-spirits	0.72	-0.14	1.82	6.95	1.12	0.59	0.05	2.78
Off-RTDs	-0.08	-0.09	0.01	-0.36	-0.02	-0.10	-0.01	0.42
On-beer	-9.27	-1.33	-18.13	-72.07	-10.64	-8.85	-1.20	-21.42
On-cider	0.42	0.00	0.71	4.30	0.28	0.46	0.25	3.17
On-wine	1.48	1.12	2.15	3.48	0.65	1.74	0.19	1.76
On-spirits	-1.83	-1.57	-1.72	-5.29	-1.98	-1.79	1.70	-11.09
On-RTDs	0.78	0.14	1.39	6.12	0.56	0.84	1.04	10.36
Total	**-6.51**	**0.53**	**-13.41**	**-65.39**	**-9.23**	**-5.67**	**3.24**	**-12.37**
Relative change in spending	**-1.1%**	**0.2%**	**-1.2%**	**-2.4%**	**-1.9%**	**-0.9%**	**0.6%**	**-0.7%**

Table 6.7(v): Detailed results table for 45p MUP (consumption effects) – elasticities estimated using national time-series data (SA5)

	Population	Moderate	Hazardous	Harmful	Low income	Higher income	16-17	18-24 Hazardous
Baseline statistics								
Baseline Consumption (units per week)	11.9	4.3	27.2	71.4	9.3	12.9	7.8	27.6
Population	41,393,296	31,964,234	7,232,457	2,196,605	11,224,815	30,168,481	1,041,951	655,712
Baseline Consumption (drinker)	14.1	5.5	27.2	71.4	12.7	14.6	11.0	27.6
Drinker population	34,889,490	25,460,428	7,232,457	2,196,605	8,213,926	26,675,564	738,841	655,712
% drinkers	84.3%	79.7%	100.0%	100.0%	73.2%	88.4%	70.9%	100.0%
% binge (>8 male, >6 female)	21.7%	11.4%	49.4%	79.4%	14.8%	24.2%	16.3%	70.8%
Mean binge if binge occurs	12.1	10.2	12.4	15.1	12.7	12.0	12.5	14.6
Sales/Consumption volume, units per drinker per year								
Off-beer	96.8	29.6	169.6	636.0	113.5	91.6	40.0	128.1
Off-cider	18.9	4.8	24.8	162.6	33.4	14.4	24.9	17.1
Off-wine	264.5	92.1	584.2	1,210.0	175.1	292.0	86.1	184.6
Off-spirits	71.1	27.2	128.1	392.3	93.3	64.3	23.6	157.9
Off-RTDs	7.8	2.1	8.7	71.7	10.1	7.2	16.4	18.7
On-beer	199.4	80.2	371.4	1,014.7	187.7	203.0	163.2	555.0
On-cider	7.7	3.2	13.2	42.5	6.6	8.1	11.0	34.7
On-wine	37.9	26.8	68.0	68.3	15.5	44.8	27.0	57.8
On-spirits	19.8	14.2	31.6	46.0	14.9	21.3	62.8	160.3
On-RTDs	12.3	4.5	19.6	78.0	11.5	12.5	118.9	124.7
Total	**736.2**	**284.5**	**1,419.3**	**3,722.1**	**661.6**	**759.1**	**573.9**	**1,438.9**
Spending, per drinker per year (£)								
Off-beer	43.08	14.54	76.51	263.83	48.64	41.37	12.33	56.01
Off-cider	7.03	2.14	9.81	54.58	11.23	5.74	10.88	7.11
Off-wine	143.16	51.74	314.08	639.95	83.73	161.46	4.49	97.34
Off-spirits	34.60	14.23	61.86	180.91	42.90	32.04	2.50	74.69
Off-RTDs	6.05	1.99	7.07	49.67	7.46	5.61	2.36	19.92
On-beer	246.57	104.80	455.97	1,200.37	212.72	257.00	179.67	698.52
On-cider	9.27	3.98	15.98	48.53	6.80	10.04	5.60	41.23
On-wine	52.04	37.19	91.73	93.57	17.93	62.54	24.06	77.08
On-spirits	48.34	36.23	74.68	102.05	33.04	53.05	128.78	368.00
On-RTDs	22.15	8.58	34.87	137.60	18.93	23.14	188.48	226.85
Total	**612.30**	**275.43**	**1,142.56**	**2,771.06**	**483.38**	**652.00**	**559.15**	**1,666.74**
After intervention / Change from baseline								
Changes in consumption (units per week)	-0.22	-0.02	-0.43	-2.44	-0.27	-0.21	-0.02	-0.02
Changes in consumption (drinker)	-0.26	-0.03	-0.43	-2.44	-0.37	-0.23	-0.03	-0.02
Changes in consumption (%)	**-1.9%**	**-0.5%**	**-1.6%**	**-3.4%**	**-2.9%**	**-1.6%**	**-0.3%**	**-0.1%**
Final Consumption (drinker)	13.9	5.4	26.8	68.9	12.3	14.3	11.0	27.6
Absolute change in sales/Consumption volume, units per drinker per year								
Off-beer	-6.6	-0.9	-10.7	-58.3	-8.1	-6.1	-1.9	-8.2
Off-cider	-5.3	-0.7	-6.0	-56.3	-12.3	-3.2	-1.9	-2.7
Off-wine	-5.9	-1.4	-12.8	-36.1	-3.8	-6.6	-0.5	-5.0
Off-spirits	-2.1	-0.5	-4.0	-15.2	-2.8	-1.9	-0.6	-5.0
Off-RTDs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-beer	5.1	1.4	9.1	34.4	6.8	4.6	1.5	12.0
On-cider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-wine	0.4	0.3	0.5	1.0	0.4	0.4	0.1	0.9
On-spirits	0.7	0.3	1.4	3.3	0.6	0.8	1.4	6.8
On-RTDs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**-13.8**	**-1.4**	**-22.7**	**-127.2**	**-19.1**	**-12.1**	**-1.8**	**-1.2**
Absolute change in spending, per drinker per year (£)								
Off-beer	0.18	0.10	0.15	1.31	0.46	0.10	-0.05	0.33
Off-cider	-0.51	-0.04	-0.50	-5.97	-1.41	-0.23	-0.03	-0.12
Off-wine	-0.03	0.29	-0.83	-1.10	1.80	-0.59	0.16	0.37
Off-spirits	0.03	0.09	-0.15	-0.09	0.44	-0.10	-0.01	0.49
Off-RTDs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-beer	6.20	1.86	11.15	40.22	7.74	5.73	1.44	15.11
On-cider	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-wine	0.59	0.46	0.66	1.79	0.51	0.61	0.12	1.17
On-spirits	1.74	0.83	3.19	7.40	1.45	1.82	2.72	15.56
On-RTDs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**8.20**	**3.59**	**13.67**	**43.55**	**10.99**	**7.34**	**4.35**	**32.90**
Relative change in spending	**1.3%**	**1.3%**	**1.2%**	**1.6%**	**2.3%**	**1.1%**	**0.8%**	**2.0%**

Table 6.7(vi): Detailed results table for 45p MUP (consumption effects) – elasticities estimated using latest HMRC elasticities (SA6)

	Population	Moderate	Hazardous	Harmful	Low income	Higher income	16-17	18-24 Hazardous
Baseline statistics								
Baseline Consumption (units per week)	11.9	4.3	27.2	71.4	9.3	12.9	7.8	27.6
Population	41,393,296	31,964,234	7,232,457	2,196,605	11,224,815	30,168,481	1,041,951	655,712
Baseline Consumption (drinker)	14.1	5.5	27.2	71.4	12.7	14.6	11.0	27.6
Drinker population	34,889,490	25,460,428	7,232,457	2,196,605	8,213,926	26,675,564	738,841	655,712
% drinkers	84.3%	79.7%	100.0%	100.0%	73.2%	88.4%	70.9%	100.0%
% binge (>8 male, >6 female)	21.7%	11.4%	49.4%	79.4%	14.8%	24.2%	16.3%	70.8%
Mean binge if binge occurs	12.1	10.2	12.4	15.1	12.7	12.0	12.5	14.6
Sales/Consumption volume, units per drinker per year								
Off-beer	96.8	29.6	169.6	636.0	113.5	91.6	40.0	128.1
Off-cider	18.9	4.8	24.8	162.6	33.4	14.4	24.9	17.1
Off-wine	264.5	92.1	584.2	1,210.0	175.1	292.0	86.1	184.6
Off-spirits	71.1	27.2	128.1	392.3	93.3	64.3	23.6	157.9
Off-RTDs	7.8	2.1	8.7	71.7	10.1	7.2	16.4	18.7
On-beer	199.4	80.2	371.4	1,014.7	187.7	203.0	163.2	555.0
On-cider	7.7	3.2	13.2	42.5	6.6	8.1	11.0	34.7
On-wine	37.9	26.8	68.0	68.3	15.5	44.8	27.0	57.8
On-spirits	19.8	14.2	31.6	46.0	14.9	21.3	62.8	160.3
On-RTDs	12.3	4.5	19.6	78.0	11.5	12.5	118.9	124.7
Total	**736.2**	**284.5**	**1,419.3**	**3,722.1**	**661.6**	**759.1**	**573.9**	**1,438.9**
Spending, per drinker per year (£)								
Off-beer	43.08	14.54	76.51	263.83	48.64	41.37	12.33	56.01
Off-cider	7.03	2.14	9.81	54.58	11.23	5.74	10.88	7.11
Off-wine	143.16	51.74	314.08	639.95	83.73	161.46	4.49	97.34
Off-spirits	34.60	14.23	61.86	180.91	42.90	32.04	2.50	74.69
Off-RTDs	6.05	1.99	7.07	49.67	7.46	5.61	2.36	19.92
On-beer	246.57	104.80	455.97	1,200.37	212.72	257.00	179.67	698.52
On-cider	9.27	3.98	15.98	48.53	6.80	10.04	5.60	41.23
On-wine	52.04	37.19	91.73	93.57	17.93	62.54	24.06	77.08
On-spirits	48.34	36.23	74.68	102.05	33.04	53.05	128.78	368.00
On-RTDs	22.15	8.58	34.87	137.60	18.93	23.14	188.48	226.85
Total	**612.30**	**275.43**	**1,142.56**	**2,771.06**	**483.38**	**652.00**	**559.15**	**1,666.74**
After intervention / Change from baseline								
Changes in consumption (units per week)	-0.33	-0.06	-0.57	-3.52	-0.47	-0.28	-0.09	-0.69
Changes in consumption (drinker)	-0.39	-0.07	-0.57	-3.52	-0.64	-0.31	-0.12	-0.69
Changes in consumption (%)	**-2.8%**	**-1.3%**	**-2.1%**	**-4.9%**	**-5.1%**	**-2.1%**	**-1.1%**	**-2.5%**
Final Consumption (drinker)	13.7	5.4	26.7	67.9	12.0	14.2	10.9	26.9
Absolute change in sales/Consumption volume, units per drinker per year								
Off-beer	-8.3	-1.3	-13.0	-73.9	-10.9	-7.5	-2.2	-10.3
Off-cider	-6.5	-0.9	-7.4	-68.8	-15.0	-3.9	-2.0	-3.4
Off-wine	-0.1	-0.1	0.1	-0.8	-0.7	0.1	-0.1	-0.5
Off-spirits	-1.4	-0.4	-2.4	-10.0	-2.3	-1.1	0.0	-3.5
Off-RTDs	0.1	0.0	0.1	0.6	0.1	0.0	0.1	0.1
On-beer	-3.3	-0.8	-5.8	-24.2	-3.8	-3.1	-1.9	-8.8
On-cider	-0.4	-0.1	-0.6	-2.5	-0.4	-0.3	0.0	-1.2
On-wine	0.5	0.3	0.9	1.1	0.2	0.5	0.0	0.8
On-spirits	-0.5	-0.3	-0.8	-1.8	-0.5	-0.5	-0.2	-4.5
On-RTDs	-0.4	-0.1	-0.6	-3.3	-0.3	-0.4	-0.1	-4.9
Total	**-20.3**	**-3.6**	**-29.6**	**-183.7**	**-33.6**	**-16.3**	**-6.4**	**-36.0**
Absolute change in spending, per drinker per year (£)								
Off-beer	-0.62	-0.08	-0.93	-5.88	-0.83	-0.56	-0.16	-0.67
Off-cider	-1.06	-0.12	-1.16	-11.59	-2.62	-0.58	-0.05	-0.42
Off-wine	3.22	1.02	6.31	18.50	3.35	3.18	0.10	2.76
Off-spirits	0.38	0.14	0.63	2.36	0.63	0.31	0.03	1.28
Off-RTDs	0.05	0.01	0.05	0.48	0.09	0.04	0.00	0.16
On-beer	-3.98	-0.98	-7.07	-28.54	-4.23	-3.91	-2.11	-10.91
On-cider	-0.43	-0.13	-0.71	-2.97	-0.42	-0.43	-0.02	-1.39
On-wine	0.65	0.39	1.27	1.64	0.30	0.76	0.01	1.01
On-spirits	-1.19	-0.70	-1.97	-4.19	-1.11	-1.21	-0.31	-10.33
On-RTDs	-0.72	-0.16	-1.12	-5.93	-0.59	-0.77	-0.22	-8.89
Total	**-3.70**	**-0.61**	**-4.71**	**-36.14**	**-5.43**	**-3.16**	**-2.72**	**-27.41**
Relative change in spending	**-0.6%**	**-0.2%**	**-0.4%**	**-1.3%**	**-1.1%**	**-0.5%**	**-0.5%**	**-1.6%**