EXECUTIVE SUMMARY

This report undertakes an economic analysis of the impact of increasing the level of taxation on tobacco products in the UK, building on previous work for ASH by Paul Johnson.[1] Because smoking imposes significant costs on the UK economy through increased NHS expenditure on smoking-related health conditions and increased mortality rates for smokers of working age, increasing tobacco taxation is likely to have a number of indirect benefits in terms of reduced early deaths in the population (and hence lower NHS costs), reduced ill health, reduced absenteeism from work, and so on.

We find that a tobacco price rise of 5% results in net benefits to the economy as a whole of around £10.2 billion (measured as a net present value of the stream of benefits over 50 years.) The economic benefits in the first five years of the policy are around £270m per year on average. Just over half of these gains are accounted for by the 'human value' of the deaths averted through a reduction in the number of smokers in the UK population. The rest of the gains are split between the value of the increased economic output resulting from fewer working age deaths, reduced absenteeism from work and lower NHS costs as a result of the tax increase.

Our analysis also shows a positive effect of the policy on the public finances, with a net revenue gain to the government of around £520m per year in the first five years on average. Just over four-fifths of this gain is due to the direct effects of increased revenue from tobacco taxation itself, but increased revenue from taxes, reduced benefit spending and reduced NHS costs all have a positive impact on revenues in addition to this.

Methodology

There are two parts to our analysis:

1. A **cost benefit analysis (CBA)** of the wider effects on the economy. A cost-benefit framework is a general approach to evaluating government interventions which attempts to quantify the overall effects of a policy on economic and social well-being, thereby helping policymakers assess whether a particular policy intervention is likely to represent 'value for money'.
2. A **public finances analysis (PFA)** of the effects on government tax revenue and government spending of the tobacco tax increase. This includes both the direct impact of a tax increase on the revenue from tobacco taxation itself, and also the indirect impact of a reduction in the number of people smoking in the UK (the 'prevalence' of smoking) on government spending and revenues.

Currently, the price of a typical pack of twenty cigarettes is just over £6, of which around 76% is tax. This report models the impact of increasing the price of a pack of cigarettes by 5% - i.e. around 30 pence. This is a *real terms* increase, so would be on top of any adjustment to allow for price inflation. It is a one-off change, i.e. we assume that the price of cigarettes increases by 5% in real terms and is then maintained in real terms at that higher level for future years.

1. Johnson P (2009) "Cost Benefit Analysis of the FCTC Protocol on Illicit Trade in Tobacco Products" London, ASH. http://www.ash.org.uk/ash_7iqt6hvz.htm

This is in line with the recommendation that ASH is making in its 2010 Budget submission that in the first instance an increase of 5% above inflation should be for one year only and increases thereafter should be at least at the rate of inflation with increases above inflation considered on an annual basis.

The magnitude of the effects of a tobacco price increase on the number of people giving up smoking in response to a price increase depends on how sensitive smoking behaviour is to tobacco prices. Our central assumption, following work by Townsend (1996)[2], is that the "prevalance elasticity" of tobacco is -0.35. This means that an increase of 5% in tobacco prices would be expected to reduce the proportion of smokers in the population from its current level of 21% of adults to (21 – (0.21 ×(0.35 × 5))) = 20.63% of adults. This equates to a reduction of around 190,000 in the total number of smokers in the population. Annex 2 of the report contains results using higher and lower values of the elasticity.

Our model assumes that half of the reduction in smoking induced by a tobacco price increase is brought about by existing smokers quitting, and the other half is due to people who otherwise would have smoked never starting. Applied to the population demographic in 2010, this would imply that 95,000 smokers quit and there are 95,000 extra people who never start smoking. Annex 4 presents some results from a sensitivity analysis where we vary the proportions of ex-smokers and people who never start smoking, which shows that the precise proportions of each make relatively little difference to the results.

Cost benefit analysis

Our CBA includes estimates of the following effects of a tobacco tax increase:

- **Savings to the National Health Service** - in 2006, £2.7 billion was spent by the NHS on treatment of smoking-related diseases in England. As the risk of developing diseases falls (due to lower smoking prevalence and decreasing risks for ex-smokers), so would the costs of treatment.
- **Output gains due to reduced mortality** - the fact that people live longer implies they will have a higher probability of surviving and being in work until the average age of retirement. Therefore, a reduction in smoking prevalence would result in output gains due to reduced mortality.
- **Output gains due to reduction in absenteeism** - there is evidence that smokers are more prone to absenteeism from work than non-smokers. As more people stop smoking, their output would increase due to reduced absenteeism.
- **Years of life gained** - the fact that people live longer (healthier) lives is in itself a benefit for these individuals and society as a whole. We use UK government departments' preferred estimate of the 'human value' of prevention of a fatality (just under £1 million) to calculate the value of extra years of life to people who give up smoking (or never take up smoking) because of the price increase.

We make the following assumptions about how benefits should be measured:

- All benefits are presented in current (i.e. 2009-10) prices.

2. Townsend J (1996) "Price and Consumption of Tobacco" *British Medical Bulletin*. To be more specific, Townsend finds that the overall elasticity of tobacco consumption - the "price elasticity" - is -0.5, and we have assumed (in line with results from previous research) that the prevalence elasticity is 70% of the price elasticity.

- Benefits are presented as Net Present Values (NPVs) over a 50 year period, using a discount rate of 3.5% per year to discount future benefits in comparison to future benefits. We also present the individual benefits in the first five years of the policy (undiscounted) for comparison.

Full details of the methodology used to produce the estimates, and the assumptions we make, are given in Chapter 3 of the report, with additional technical information in Annex 1.

Table 3 (reproduced from the main report) shows the estimates from the CBA under our central assumptions regarding the prevalence elasticity of tobacco and the health risks which people who give up smoking face compared with people who have never smoked.

Table 3. Results from CBA of 5% increase in tobacco prices: central scenario

All figures in £m, 2010 prices

		Individual years				
Cost/benefit	**Overall NPV**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
NHS cost savings	1,968	23.3	25.3	27.3	29.5	31.7
Output - reduced absenteeism	1,364	22.7	25.9	29.9	34.3	38.5
Output from extra working life	1,146	33.3	34.1	34.7	35.4	36.2
Value of extra life	5,746	178.6	179.9	180.3	181.0	182.1
TOTAL	**10,225**	**257.9**	**265.2**	**272.3**	**280.1**	**288.5**

Overall, the Net Present Value of increasing tobacco prices by 5% adds up to £10.2 billion - a substantial benefit. The benefits in individual years average around £270m per year.

Public Finances Analysis

The PFA includes estimates of the following impacts of the tobacco tax increase on the public finances:

- **Increased revenue from tobacco taxation** - following Townsend (1996) we assume that the price elasticity of tobacco (i.e. the sensitivity of *overall tobacco consumption* to tobacco price - rather than the prevalence elasticity discussed earlier) is -0.5 in our central scenario. This means that an increase in the price of tobacco products leads to an increase in revenue.
- **Savings to the NHS** - calculated as for the CBA above.
- **Increased tax receipts from additional working life** - people of working ages whose deaths are averted through giving up smoking (or not starting smoking) due to the tobacco tax increase will have longer working lives and hence pay more in income tax and National Insurance contributions (NICs) to the Exchequer. They will also spend at least some of their additional disposable income and hence pay more VAT.
- **Increased tax receipts from reduced absenteeism** - the extra output from reduced absenteeism among people who stop smoking (or never take up smoking) following the tax increase leads to increased income tax, NICs and VAT receipts.

- **Reduced spending on benefits related to sickness and disability** - smoking is associated with increased ill-health in the population as well as increased mortality. We estimate the reduction in expenditure on benefits for people of working age with long-standing health conditions (such as Employment and Support Allowance and Disability Living Allowance) which would result from a reduction in smoking caused by the tax increase.
- **Increased spending on benefits for retired people** - increased longevity as a result of reductions in smoking leads to some increased spending on state benefits for people over 65 - the State Retirement Pension and Pension Credit - because of reduced working-age mortality.

The PFA measures the net effects of the tobacco tax increase on government revenue over the five years from 2010-11 to 2014-15 rather than a 50-year Net Present Value. This is because the government is particularly concerned with the effects of policy changes in the next few years (e.g. the life of the next parliament) and there is a large degree of uncertainty over some of the components which would have to be included in a public finances analysis over a fifty-year time horizon but which can be excluded from a shorter-term analysis (e.g. end-of-life healthcare costs for people who survive into old age as a result of not smoking).

Table 4 (taken from the main body of the report) shows the results from the public finances analysis.

Table 4. Results from PFA of 5% increase in tobacco prices: central scenario

All figures in £m, 2010 prices
Positive numbers = net revenue gain, negative numbers = net revenue loss

	Individual years					
Cost/benefit	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**Average**
Increased tobacco taxation	427.4	430.6	433.7	436.9	439.9	433.7
NHS cost savings	23.5	24.2	27.6	29.7	31.9	27.4
Income Tax/NICs/VAT - extra working life	14.2	14.6	14.9	15.3	15.7	14.9
Income Tax/NICs/VAT - reduced absenteeism	12.6	14.4	16.5	18.8	21.0	16.7
Reduced disability benefits	33.0	33.1	33.3	33.4	33.5	33.3
Increased pensioner benefits	-3.3	-3.4	-3.5	-3.7	-3.9	-3.6
TOTAL	**504.9**	**511.7**	**518.8**	**526.2**	**533.5**	**519.0**

Increased revenue from tobacco taxation accounts for the majority of the increase in net revenues - around 83% of the total average revenue per year of just over £500m. Reduced spending on disability benefits is the next biggest single item of revenue gain at just over £30m per year.