Smoking Ban and Life Satisfaction: Evidence from the UK

Timothy Hinks and Andreas Katsaros[1]

ABSTRACT

This paper contributes to the literature on happiness economics by testing whether a national smoking ban contributes to changes in smoking behaviour amongst smokers in England, Wales and Northern Ireland. Based on 'set-point' theory and the idea of the hedonic treadmill it is argued that the ban may only have a temporary impact on happiness of smokers and non-smokers.

1. INTRODUCTION

THEORETICAL WORK ON THE ECONOMIC THEORY OF ADDICTION by Becker and Murphy (1988) provides a reason why people decide to consume addictive and medically harmful substances such as cigarettes. Empirical support for this model is provided in Becker et al (1994). The main conclusion from this work is that price increases reduce the utility of smokers. Using life satisfaction as a measure of utility, Gruber and Mullainathan (2005) challenge the rational addiction theory. They find evidence in the United States that higher excise duty on cigarettes causes life satisfaction of smokers' to increase. One explanation is that smokers perceive taxation as a self-control mechanism by government that increases their happiness. In this paper we contribute to the debate by providing empirical evidence on the hitherto unexplored relationship between life satisfaction of smokers and non-smokers and a national ban on smoking. In England, Wales and Northern Ireland national smoking bans were introduced between April and July 2007, having been pioneered in Scotland in March 2006. The smoking bans prohibited smoking in all public places.

According to the Smoking Related Behaviour and Attitudes Survey (ONS, 2008) the majority of smokers agreed with the ban in most public places (e.g. at work, restaurants and public indoor areas). However the one venue where the majority of current smokers (54 per cent) did not agree with smoking restrictions was in pubs (ONS, 2008, Table 7.2, p. 84). There has been a switching of customers in pubs away from smokers towards non-smokers, with 25 per cent of smokers in 2008-09 frequenting the pub less often than before

the ban and 19 per cent of non-smokers frequenting the pub more often. At the same time there has been no discernible change in the behaviour of smokers, smoking in the presence of non-smokers (ibid, Table 6.11, p. 76). The majority of smokers smoke less around non-smokers or do not smoke at all. This indicates that the majority of smokers consider the health of others and are aware of the negative externalities (passive smoking). However a smoking ban, particularly in pubs, imposes a change on their behaviour and could correlate to diminished perceptions of freedom of those who choose to smoke, as well as increasing the stigmatising of smokers. Whether these effects are persistent is an empirical question and one which we address in this paper.

This paper is organised as follows. The next section discusses the analytical foundations of consuming highly addictive goods, as well as set-point theory of happiness that considers changes to happiness to be only temporary. Section 3 discusses the data and the analytical framework adopted to test the impact of the smoking ban on smokers' life satisfaction. Section 4 discusses the descriptive statistics and results and the implications of the main findings. A conclusion ends the paper.

2. Micro-foundations of addiction

There is a well established literature on the consumption of addictive goods with most empirical work focussing on tobacco and alcohol consumption (Saffer and Chaloupka, 2000; Powell *et al*, 2005; Baltagi and Griffen, 2002; Grossman *et al*, 1993). The rational addiction model of Becker and Murphy (1988) was the first attempt at understanding why consumption of harmful goods persists. Rational here means people maximising utility consistently over time. A good may be addictive if increases in past consumption cause current consumption to increase, so reinforcing addiction. People are more likely to become addicts if they discount the future heavily. One prediction of the rational addiction model and confirmed by Becker *et al* (1994) is that increasing the cost of smoking will decrease the cigarette consumption of smokers, but this will make them worse off since the price of a good they enjoy has increased.

This theory is not without criticism. Alternative theories of addictive consumption focus instead on consumer myopia (Winston, 1980; Thaler and Shefrin, 1981). Akerlof (1991) argues that utility from consumption of addictive goods changes with or without the individual knowing. In the rational addiction model, if a person is a non-smoker then they have a clear preference not to smoke. However there are many ex-smokers who would prefer to smoke than not smoke. These ex-smokers behave irrationally since they do not maximise utility. George (2004, p. 21) argues that such behaviour is not irrational; rather that preferences of these ex-smokers is more complex, with there being a difference between the revealed or overall preference to not smoke and the intrinsic preference to smoke. Sometimes the intrinsic (or 'second-order') preference is consistent with the revealed (or 'first-order') preference and the subsequent choice. It is also possible, though, that intrinsic preferences and first-

order preferences are not consistent. For example, the ex-smoker intrinsically prefers smoking to not smoking but, through understanding the long-term harm of smoking, chooses not to smoke. Smokers quit smoking for a variety of economic and non-economic reasons. In the United States, excise duty on tobacco products has been found to reduce cigarette consumption (Grossman, 2004; Colman *et al*, 2003), while the probability of quitting smoking increases in education, age and occupation level (Kabat and Wynder, 1987). Foster and Jones (2001) find similar results in the UK, where the highly educated and members of higher skilled occupational groups smoke for shorter periods of time before quitting. They also find that a 5 per cent increase in excise duty on cigarettes 'would lead, on average, to a reduction in years of smoking between 2 and 3.5 years' with this reduction meaning quitting is brought forward (ibid, p. 27).

The rational addiction theory has been tested by Gruber and Mullainathan (2005). In the United States and Canada they find a positive and significant relationship between the utility of smokers and cigarette prices. This runs counter to the theoretical predictions of Becker and Murphy (1988). Gruber and Mullainathan (2005) argue that, under time-inconsistent models, higher tobacco taxes act as a self-control measure that reduces tobacco consumption which, in turn, increases the utility of smokers.

As with Gruber and Mullainathan (ibid) this paper estimates life satisfaction equations across different years but, rather than testing what impact a change in price has on satisfaction, we test what impact the UK smoking ban has had on people's happiness. In this paper we use information on individual life satisfaction for the UK using the British Household Panel Survey (BHPS). The term life satisfaction has frequently been interchanged with happiness and to some extent also with subjective well-being and quality of life.[2] The economics of happiness stems from the initial findings of Easterlin (1974), but has gathered pace in academic credibility in the last decade.[3] One of the interesting predictions of the happiness literature is that people adapt to changing circumstances, whether these be positive or negative. A common example is to think of someone who places huge emphasis in the workplace on being promoted, since this brings with it greater income and status. The individual would expect to move to a higher utility curve as a result of this, since his bundle of goods will increase and/or change. Hence more income is predicted to increase utility: but the Easterlin paradox states that across time, GDP per capita increases have not resulted in any significant increase in national average happiness or life satisfaction scores. One theoretical explanation from the happiness economics literature is that income increases have only a temporary impact on utility and that eventually people, and indeed nations, adapt to these changes. As a consequence utility reverts back to some 'set-point' (Lucas *et al*, 2004).[4]

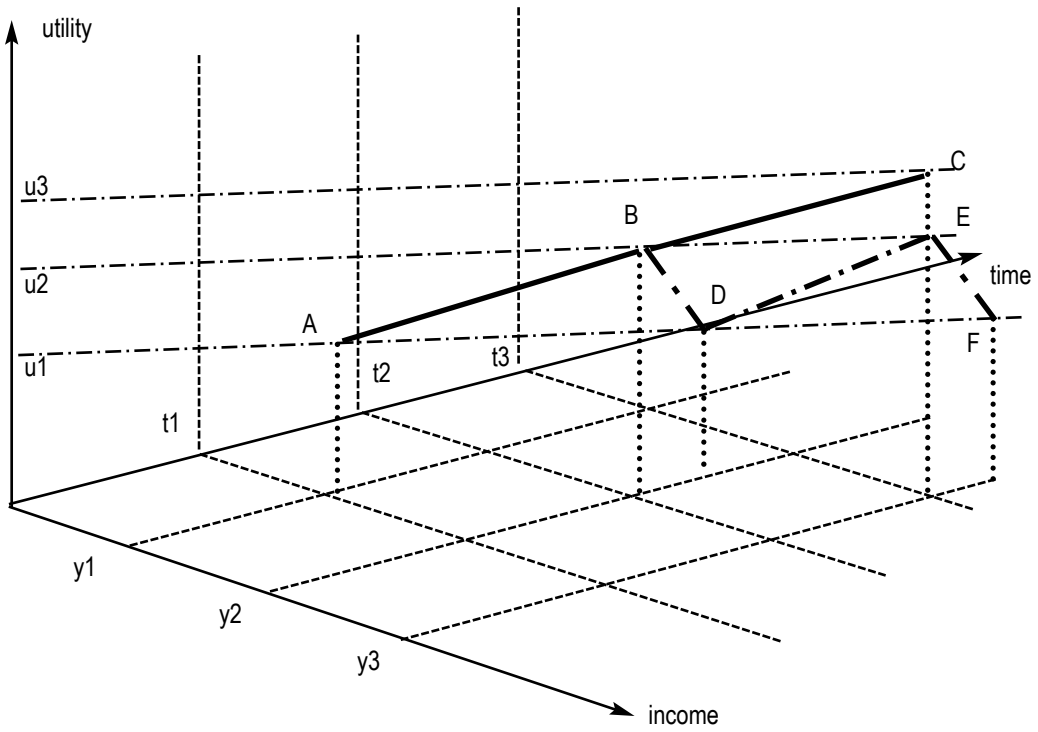
Figure 1 illustrates a 3-D representation of adapting to new income levels over time. The x-axis represents income, the y-axis represents utility and the z-axis represents time. We start at point A at time 't' where income is y1 and utility u1. Upon promotion in t+1 the worker moves to y2, which gener-

ates initial new utility u2, where u2>u1 at 'B'. Under traditional utility theory, if there was a further increase in income to y3 in t+2, then utility would increase to u3 (point 'C') and we observe diminishing marginal utility in income. With 'set-point' theory though, people adapt to their new found wealth and tend back towards a predetermined point of utility, in our case u1. This move towards u1 will not be immediate, but will take place between t+1 and t+2. The individual then moves from 'B' to 'D', so that utility falls back to u1 at the higher income y2. Another promotion results in a movement to y3 in period t+2, with utility moving to u2 again and point 'E'. As before though, the worker's adaptation to his new found wealth means utility falls back to u1 and to point 'F': any increase in income has only a temporary effect on utility.

The opposite does not occur. Tversky and Kahneman (1991) found decreases in income had considerably greater effect on well-being than increases in income. This aversion to loss was generalised into the 'endowment effect' (Kahneman, Knetsch, and Thaler, 1991), which found people to be less adaptable to a decline in income and that instead of moving from 'F' to 'D' in Figure 1, adapting to less income, they instead moved to a lower utility level below u1.

A number of empirical studies confirm set-point theory for either posi-

Figure 1: Adapting to new income levels



tive or negative income shocks. Gardner and Oswald (2006) find that large income windfalls from a lottery win has a positive impact on wellbeing relative to losers and small winners. Over time, happiness declines but not back to the pre-lottery win level. Oswald and Powdthavee (2008) find that people who become disabled after an accident show a remarkable resilience, so that happiness levels bounce back although never to pre-accident levels. Those who are severely disabled only claw back some of the loss in happiness.

That changes to income or indeed any prices will only have a temporary impact on utility is a strong prediction and one that directly challenges rational addiction theory. For this paper, the concept of a set-point provides an alternative theory to that of rational addiction. Rather than discussing changes in price as Gruber and Mullainathan (2005) do, we look at a change in legislation and how this impacts on people's life satisfaction. It could be that public smoking bans increase the utility of non-smokers and decrease the utility of smokers. A permanent decrease in utility of smokers would be consistent with a rational addiction argument, while a temporary decline in utility would be consistent with set-point theory. Any positive effect on smokers' utility would be consistent with the findings of Gruber and Mullainathan (2005) and with the self-control argument. As well as testing for differences between smokers and non-smokers, the paper also focuses on those who quit or began smoking between 2003 and 2008, and whether there are significant differences between these groups.

The paper then focuses on smokers' happiness. We analyse whether the ban impacts differently on the happiness of light and heavy smokers. The ban could adversely affect social aspects of being part of a group, as well as being perceived by smokers as being an infringement of their personal liberties. For these reasons, a finding that life satisfaction is reduced because smokers feel they are forced to reduce the number of cigarettes they consume as a result of the ban, may not be surprising. Following this line of argument, it is expected that life satisfaction of heavy smokers will be reduced more than lighter smokers by the ban, since they will need to curtail their intrinsic desires more. Any positive impact will be consistent with smokers viewing the ban as a self-control mechanism that will increase their life satisfaction.

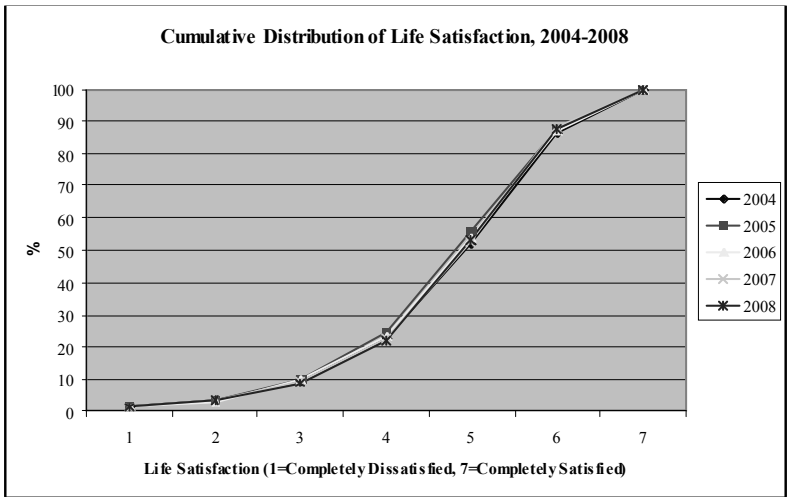
3. Data and Analytical Framework

Our data are derived from the British Household Panel Survey. This is a nationally representative survey of some 5,500 private households, comprising approximately 10,000 individuals. Information on life satisfaction is gathered by asking the question 'How dissatisfied or satisfied are you with your life overall?', with answers ranging from 1 (not satisfied at all) to 7 (completely satisfied). Since we are concerned with the impact of the smoking ban, we have constrained the period of study to include information from 2003 to 2008, so a 'before and after' analysis can be performed. The BHPS has a number of advantages over other data sources. Firstly it is a large and well respected data set that provides important insights into life in the UK. The panel nature of the BHPS means many of

those questioned in 2003/04 were also interviewed in subsequent years. Finally the BHPS is carried out in September of every year, meaning we have a natural experiment of the impact a smoking ban has on people's happiness.

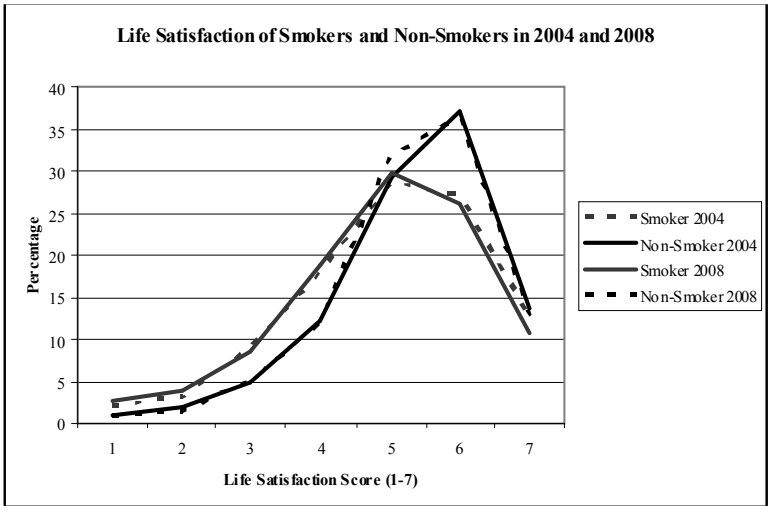
Figure 2 indicates the distribution of life satisfaction scores. The majority of respondents report life satisfaction of between 5 and 6 (over 60 per cent for all years), indicating that most people are at least 'somewhat satisfied' with their life. The distribution of life satisfaction for smokers and non-smokers in 2004 and 2008, in Figure 3, indicates that proportionally more non-smokers report satisfaction in the top three satisfaction categories, whilst proportionally more smokers will report being at best somewhat dissatisfied with their lives.

Figure 2



Source: Authors computations from BHPS 2004-2008.

Figure 3



Source: Authors computations from BHPS 2004-2008.

We capture changes in smoking behaviour by following individuals over a three year rolling period. We begin by collating data for 2003, 2004 and 2005. From this information we define variables for all the permutations that occur within this three year period. Someone can never smoke, someone can always smoke, someone can smoke in 2003, quit in 2004 and smoke in 2005. There are eight permutations in all and eight variables are created for analysing life satisfaction of smokers, non-smokers and those who change their smoking behaviour. Table 1 provides an example for the years 2003 to 2005. The reference group in our model is always people who smoke in all three years. Satisfaction equations are usually estimated using an ordered probit model because of the ordinal nature of satisfaction, but interpreting the scale and size of these coefficients is difficult. Ferrer-i-Carbonell and Frijters (2004) find that the ordinary least squares (OLS) model produces comparable results to the ordered probit model, but coefficients are easier to interpret. In this paper we initially adopt both ordered probit and OLS models. The core satisfaction equation will include adult equivalent household income, economic activity of the individual, subjective health, gender, marital status, country and the age and age-squared of the individual. To this model we add the group of smoking variables defined in Table 1. The equation to be estimated is:

Table 1

2003	*2004*	*2005*
Smoker	Smoker	Smoker
Non smoker	Non smoker	Non smoker
Smoker	Non smoker	Smoker
Non smoker	Smoker	Non smoker
Smoker	Smoker	Non smoker
Non smoker	Non smoker	Smoker
Smoker	Non smoker	Non smoker
Non smoker	Smoker	Smoker

$$(U_{it}) = \alpha_{it} + \underline{\beta}_{it} Smoke_{it} + \underline{\psi}_{it} X_{it} + \varepsilon_{it} \quad (1)$$

Life satisfaction is represented by U_{it}. 'Smoke' represents the different categories from Table 1 for individual i in year t. The reference group will be those people who smoked throughout the three year period. $\underline{\beta}_{it}$ represents the vector of coefficients for the smoking variables and $\underline{\psi}_{it}$ represents the coefficients for the controls in the model. The error term ε_t is assumed to be normally distributed with an expected value of zero.

The analysis will then turn to smokers as a group. Our analytical approach begins with the identification of 3 distinct categories that capture different types of smoking behaviour amongst smokers.

1. If the respondent increased the daily number of cigarettes between t and t+1

2. If the respondent decreased the daily number of cigarettes between t and t+1

3.If the respondent did not change the daily number of cigarettes between t and t+1

The reference group is no change in cigarette consumption. The other categories capture *changes* in behaviour. We are not modelling the decision to start or stop smoking, or the two step process of whether someone smokes or not and if they do how much they smoke. This analysis is concerned about changes in behaviour of smokers.[5] Changes can occur because of a conscious effort by the individual. The enforcement of a ban, though, is something that is imposed on smokers and while this may cause them to change their behaviour, it is unclear whether this will increase utility or decrease utility. The equation to be estimated is:

$$(U_{it} \mid Smoker \quad in \quad t-1 \quad and \quad t) = \alpha_{it} + \beta_{1t} Increase \quad Smoke_{it} + \beta_{2t} Reduce \quad Smoke_{it} + \psi_{it} X_{it} + \varepsilon_{it} \qquad (2)$$

The coefficients on the smoking variables are interpreted relative to the smoker who does change the number of cigarettes they smoke between the two years. The control variables used in the equation are identical to those in equation (2).

Since the models we estimate are based on individuals encountering a smoking ban in the same year, individuals from Scotland are not included in the analysis since they would bias our results. For example, one of the hypotheses we test is whether a ban in period *t* causes only a temporary change in utility in *t*+1 which reverts back to a set-point of utility in *t*+2. If Scotland were included in the analysis then this adaptation process may have occurred already for Scottish people, which would bias our smoking ban coefficient downwards for the remainder of the UK.[6]

4. Descriptive statistics and results

The majority of people from our samples have not smoked between 2003 and 2008. The next largest group are those who have smoked for the past 3 years. In 2005, 19.2 per cent of people smoked, declining monotonically with each year to 16.9 per cent in 2008 (see Table 2). The other groups of smokers comprise just 6-7 per cent between them. Almost 70 per cent of people perceive themselves as being in good or excellent health and the average individual in all four years is fairly satisfied with their life (scoring over five out of seven). Females comprise the majority of our samples and the average age is around 50 years. Most people are employed, followed by those who have retired, the self-employed and family carers. Over 70 per cent of people in the sample are married.

The ordered probit results are reported in Table 3. Findings are consistent over the years and are in line with previous empirical work. The smoking categories reveal strong evidence that non-smokers are significantly happier than smokers. Those people who have never smoked report higher levels of life satisfaction when compared to people who have always smoked. Given controls for subjective health, this indicates that smokers know this habit is bad for their happiness but continue to smoke anyway. This finding suggests that, on average, smokers do not have some underlying preference for smoking that is consistent with their first order preference for smoking, but that instead they

know smoking is bad for them but cannot stop. One implication of this is that any increase in the cost of smoking through tax rises will likely bring about a reduction in the happiness gap between smokers and non-smokers, because smokers interpret the tax as a way of self-control by government. There is some increase in the happiness premium of non-smokers in both 2007 and 2008, but this is not statistically significant.

Table 2: Mean or proportion of variables 2005-2008

Variable	*2005*	*2006*	*2007*	*2008*
Life Satisfaction (1 not satisfied at all - 7 completely satisfied)	5.165	5.224	5.231	5.237
Smoking Categories: Smoking status over 3 years				
Smoker in all 3 years	0.192	0.183	0.177	0.169
Non-Smoker in all 3 years	0.734	0.744	0.756	0.768
Smoker: Non-Smoker: Smoker	0.009	0.010	0.007	0.012
Non-Smoker: Smoker: Non-Smoker	0.006	0.005	0.006	0.003
Non-Smoker: Smoker: Smoker.	0.013	0.014	0.011	0.010
Non-Smoker: Non-Smoker: Smoker	0.008	0.008	0.006	0.007
Smoker: Non-Smoker: Non-Smoker	0.017	0.018	0.017	0.015
Smoker: Smoker: Non-Smoker	0.021	0.019	0.020	0.015
Logarithm of Equivalised household income	6.888	6.940	6.979	7.009
Excellent Health	0.216	0.239	0.224	0.201
Good Health	0.486	0.461	0.464	0.479
Fair Health	0.211	0.210	0.221	0.228
Poor Health	0.070	0.070	0.071	0.075
Very Poor Health	0.017	0.020	0.019	0.017
Age	49.219	50.281	51.399	52.080
Age-Squared	2695.102	2800.837	2915.754	2981.699
Male	0.439	0.440	0.438	0.442
Self-employed	0.076	0.079	0.076	0.076
Employed	0.528	0.520	0.513	0.507
Unemployed	0.023	0.021	0.018	0.022
Retired	0.233	0.251	0.265	0.276
Maternity Leave	0.005	0.004	0.005	0.004
Family Carer	0.074	0.071	0.068	0.063
Sick	0.046	0.042	0.047	0.045
Government Training	0.000	0.000	0.000	0.000
Full-Time School	0.014	0.011	0.007	0.006
Married	0.710	0.716	0.716	0.721
Widowed	0.070	0.074	0.079	0.079
Separated	0.081	0.080	0.080	0.081
Single	0.138	0.130	0.124	0.117
England	0.616	0.621	0.618	0.630
Wales	0.202	0.206	0.206	0.209
Northern Ireland	0.182	0.173	0.176	0.161
Sample Size	8,007	7,962	7,885	7,636

Source: Authors' computations from *BHPS* 2003-2008

Table 3 Ordered Probit of Life Satisfaction, 2005-2008

	2005		*2006*		*2007*		*2008*	
	Ordered Probit	*OLS*	*Ordered Probit*	*OLS*	*Ordered Probit*	*OLS*	*Ordered Probit*	*OLS*
Non-Smoker in all 3 years	0.070**	0.093**	0.100***	0.124**	0.112***	0.140***	0.107***	0.144***
Smoker: Non-Smoker: Smoker	-0.086	-0.119	0.066	0.091	0.021	-0.014	-0.135	-0.125
Non-Smoker: Smoker: Non-Smoker	-0.002	0.015	-0.013	-0.005	-0.152	-0.127	-0.127	-0.136
Non-Smoker: Smoker: Smoker.	-0.071	-0.075	0.000	0.000	0.014	0.008	-0.017	-0.015
Non-Smoker: Non-Smoker: Smoker	0.095	0.092	-0.242**	-0.244*	-0.031	0.041	-0.052	-0.045
Smoker: Non-Smoker: Non-Smoker	0.009	0.025	0.070	0.110	0.078	0.108	0.079	0.089
Smoker: Smoker: Non-Smoker	0.126	0.153	0.000	0.037	0.064	0.094	0.130	0.182*
Logarithm of Equivalised household income	0.029	0.051**	0.060***	0.080***	0.037*	0.055**	0.028	0.041**
Excellent Health	1.437***	1.766***	1.581***	1.785***	1.656***	1.914***	1.636***	1.852***
Good Health	1.128***	1.457***	1.205***	1.427***	1.280***	1.567***	1.269***	1.510***
Fair Health	0.783***	1.060***	0.708***	0.883***	0.853***	1.095***	0.809***	1.020***
Poor Health	0.374***	0.522***	0.455***	0.566***	0.463***	0.619***	0.405***	0.523***
Age	-0.026***	-0.027***	-0.016***	-0.017***	-0.026***	-0.025***	-0.025***	-0.025***
Age-Squared	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Male	-0.061**	-0.056**	-0.041*	-0.032	-0.045*	-0.037	-0.048*	-0.040
Self-employed	0.339***	0.439***	0.417***	0.561***	0.338***	0.429***	0.345***	0.455***
Employed	0.242***	0.332***	0.350***	0.483***	0.208**	0.304**	0.297***	0.413***
Retired	0.456***	0.534***	0.632***	0.739***	0.504***	0.578***	0.470***	0.548***
Maternity Leave	0.664***	0.777***	0.837***	0.981***	0.696***	0.781***	0.660***	0.764***
Family Carer	0.103	0.134	0.342***	0.444***	0.158	0.203	0.172	0.248**
Sick	-0.070	-0.111	0.118	0.138	-0.095	-0.192	0.042	0.033
Government Training	1.506*	1.566**	0.881	0.879	0.692	0.639	0.252*	0.478**

...cont.

Full-Time School	0.353***	0.458***	0.448***	0.591***	0.467***	0.574***	0.526***	0.666***
Married	0.462***	0.553***	0.415***	0.468***	0.332***	0.376***	0.363***	0.405***
Widowed	0.182**	0.235***	0.103	0.153**	-0.013	0.015	0.016	0.057
Single	0.224***	0.289***	0.206***	0.244***	0.072	0.100	0.112*	0.131**
England	-0.211***	-0.199***	-0.179***	-0.175***	-0.178***	-0.165***	-0.185***	-0.181***
Wales	-0.144***	-0.149***	-0.075*	-0.081*	-0.119***	-0.129**	-0.081*	-0.093**
Constant		3.203***		2.659***		3.199***		3.204***
Observations	8,007		7,962		7,961		7,690	
Mean Life Satisfaction	5.165		5.224		5.231		5.237	
Pseudo R^2	0.0532		0.0643		0.0635		0.0639	
Log-Likelihood	-12033.886		-11635.194		-11591.287		-11127.949	

Source: Authors Computations.
Note: ***, **, * indicate statistical significance at the 1%, 5% and 10% level. The reference group is a female smoker who is unemployed, separated and living in Northern Ireland.

Table 4: Coefficients on Smoking categories with and without controls for Marital Status

	2005		*2006*		*2007*		*2008*	
	With Marital Status	Without Marital Status	With Marital Status	Without Marital Status	With Marital Status	Without Marital Status	With Marital Status	Without Marital Status
Non-Smoker in all 3 years	0.070**	0.105***	0.100***	0.135***	0.112***	0.141***	0.107***	0.138***
Smoker: Non-Smoker: Smoker	-0.086	-0.061	0.066	0.086	0.021	0.014	-0.135	-0.121
Non-Smoker: Smoker: Non-Smoker	-0.002	0.053	-0.013	-0.004	-0.152	-0.117	-0.127	-0.082
Non-Smoker: Smoker: Smoker.	-0.071	-0.074	0.000	0.017	0.014	0.014	-0.017	-0.036
Non-Smoker: Non-Smoker: Smoker	0.095	0.115	-0.242**	-0.243**	-0.031	-0.029	-0.052	-0.030
Smoker: Non-Smoker: Non-Smoker	0.009	0.045	0.070	0.089	0.078	0.088	0.079	0.100
Smoker: Smoker: Non-Smoker	0.126	0.123	0.000	0.019	0.064	0.073	0.130	0.135

Health is a significant contributor to life satisfaction/happiness, with those in very poor health significantly worse off than all the other groups. The contribution each variable makes to life satisfaction is not straightforward when using ordered probit, so an OLS model is also estimated. Comparing the signs on the coefficients, the ordered probit and OLS estimations are consistent with each other. There are very few differences in significance too and we conclude that the results are robust to the form the dependent variable takes. We find that someone in excellent health in 2005 is 1.77 points happier than someone in very poor health. That happiness can increase by almost 2 points on the 1-7 Likert scale indicates the importance of health to overall happiness. Both age and age-squared have the correct sign and illustrate that happiness is U-shaped in age. Happiness is at its lowest between the ages of 34 and 41 years.[7] Economic activity tends to have a significant and relatively large effect on happiness. For example, those who are self-employed in 2008 are happier by 0.46 points than people who are unemployed. The happiest group are those who have retired or who are on maternity leave.

Those who are married or single are consistently happier across all years compared to those who are separated, with the scale of this happiness being as much as half of one point on the happiness scale. There is a potential issue here of multicollinearity between marital status and whether someone smokes. It could be that people are more likely to revert back to smoking or take up the habit for the first time after they separate from their partner. When the group of marital status variables is removed from the model, there is some change in the size of coefficients, particularly with regard to those who have never smoked, though not any change in sign as seen in Table 4. We conclude that multicollinearity is only a minor concern for the purposes of this paper.

Those with higher log of per capita household income report greater levels of happiness. In 2007 a doubling of income per capita will raise the happiness score by 0.06 points. That absolute income levels are relatively unimportant should not be a surprise given previous findings by Clark and Oswald (1996), Blanchflower *et al* (1993) and Clark (2003).[8]

The next step is to analyse smokers only, and whether reducing or increasing cigarette consumption per week has any impact on life satisfaction before and after the smoking ban. Descriptive statistics for smokers and non-smokers are presented in Table 5. Of particular interest to us is the finding that the share of smokers who decrease their cigarette consumption increases to 32.1 per cent in 2007, relative to 23.5 per cent in 2006 and 28.6 per cent in 2005. In 2008 the decline settles back to 25.2 per cent. At least 40 per cent of smokers do not change their intake of cigarettes for each of the four years. This finding indicates that the smoking ban has had a one-off effect on increasing the likelihood of reducing cigarette consumption of smokers.

Smokers are on average a far less healthy group than non-smokers. Smokers are more likely to report being very poorly, have a lower average age and are more likely to have been sick in the previous week.[9]

Table 5: Mean of Proportion of Variables

	Smokers	*Non Smokers*	*Smokers*	*Non Smokers*	*Smokers*	*Non Smokers*	*Smokers*	*Non Smokers*	*Smoker in all years*			
Variable	*2005 Mean or %*	*2005 Mean or %*	*2005 Mean or %*	*2005 Mean or %*	*2005 Mean or %*	*2005 Mean or %*	*2005 Mean or %*	*2005 Mean or %*	*2005 Mean or %*	*2005 Mean or %*	*2005 Mean or %*	*2005 Mean or %*
Life Satisfaction	4.875	5.240	4.918	5.298	4.901	5.310	4.900	5.312	4.824	4.883	4.862	4.887
Smoker increases cigarette consumption	0.269	N/A	0.276	N/A	0.238	N/A	0.291	N/A	0.261	0.301	0.227	0.272
Smoker decreases cigarette consumption	0.286	N/A	0.235	N/A	0.321	N/A	0.252	N/A	0.282	0.257	0.323	0.251
Smoker does not change behaviour	0.445	N /A	0.394	N /A	0.441	N /A	0.457	N /A	0.457	0.442	0.450	0.477
Log Household Income (Adult Equivalent)	6.763	6.920	6.808	6.972	6.849	7.010	6.858	7.043	6.735	6.784	6.826	6.849
Excellent health	0.163	0.230	0.192	0.249	0.182	0.235	0.142	0.215	0.154	0.192	0.182	0.142
Good health	0.451	0.495	0.434	0.469	0.423	0.473	0.451	0.485	0.446	0.423	0.406	0.448
Fair health	0.253	0.200	0.247	0.202	0.268	0.210	0.278	0.216	0.253	0.248	0.275	0.274
Poor health	0.102	0.062	0.097	0.064	0.089	0.067	0.103	0.069	0.111	0.103	0.096	0.109
V poor health	0.031	0.014	0.031	0.017	0.038	0.015	0.027	0.015	0.036	0.034	0.041	0.027
Age	43.905	50.592	45.022	51.582	46.039	52.555	47.023	53.162	44.342	45.416	46.458	47.234
Age-Squared	2141.421	2838.156	2242.996	2939.250	2331.023	3043.002	2426.334	3101.154	2174.273	2272.388	2367.976	2438.564
Male	0.429	0.442	0.429	0.442	0.427	0.442	0.440	0.443	0.423	0.424	0.416	0.425
Self-employed	0.069	0.078	0.070	0.081	0.071	0.077	0.071	0.076	0.064	0.068	0.064	0.067
Employee	0.550	0.523	0.541	0.513	0.531	0.511	0.515	0.507	0.534	0.528	0.517	0.517
Retired	0.044	0.018	0.049	0.015	0.042	0.012	0.049	0.016	0.050	0.048	0.047	0.046
Maternity Leave	0.129	0.259	0.139	0.279	0.143	0.293	0.156	0.303	0.124	0.134	0.146	0.151
Family Care	0.003	0.006	0.004	0.005	0.002	0.006	0.001	0.004	0.002	0.002	0.001	0.001
Sick	0.103	0.067	0.103	0.063	0.103	0.060	0.098	0.056	0.113	0.113	0.112	0.104

...cont.

Government Training Scheme	0.089	0.034	0.083	0.032	0.099	0.034	0.101	0.033	0.100	0.096	0.104	0.105
Full-Time School	0.000	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.002	0.000	0.001
Unemployed	0.013	0.014	0.009	0.012	0.008	0.007	0.008	0.005	0.014	0.009	0.008	0.009
Married	0.633	0.730	0.639	0.734	0.643	0.733	0.638	0.739	0.629	0.626	0.637	0.640
Widowed	0.043	0.077	0.048	0.080	0.045	0.086	0.053	0.084	0.046	0.050	0.047	0.053
Separated/ Divorced	0.136	0.067	0.129	0.068	0.137	0.067	0.135	0.070	0.140	0.138	0.141	0.137
Single	0.189	0.125	0.183	0.118	0.174	0.113	0.172	0.106	0.186	0.185	0.175	0.168
England	0.588	0.623	0.595	0.631	0.573	0.627	0.581	0.639	0.568	0.574	0.572	0.584
Wales	0.210	0.200	0.215	0.203	0.225	0.203	0.230	0.206	0.219	0.225	0.226	0.228
Northern Ireland	0.201	0.177	0.190	0.166	0.201	0.169	0.189	0.154	0.213	0.201	0.202	0.188
Observations	1,644	6,363	1,569	6,393	1,501	6,461	1,393	6,297	1,252	1,228	1,232	1,173

Table 6: Ordinary Least Squares Regressions

	2005		2006		2007		2008	
Dependent variable = life satisfaction	*(1) All Smokers*	*(2) Heavy Smokers, >9 cigarettes a day*	*(3) All Smokers*	*(4) Heavy Smokers, >9 cigarettes a day*	*(5) All Smokers*	*(6) Heavy Smokers, >9 cigarettes a day*	*(7) All Smokers*	*(6) Heavy Smokers, >9 cigarettes a day*
Smoker increases cigarette consumption	0.053	0.038	0.079	0.055	-0.042	0.007	-0.006	-0.090
Smoker decreases cigarette consumption	-0.025	-0.116	0.066	0.091	-0.165**	-0.179**	0.110	0.171*
Log Household Income (Adult Equivalent)	-0.030	-0.030	0.056	0.050	0.034	-0.040	0.120*	0.103
Excellent Health	2.108***	2.109***	1.673***	1.626***	1.937***	1.901***	2.308***	2.222***
Good Health	1.767***	1.772***	1.344***	1.333***	1.720***	1.698***	1.922***	1.789***
Fair Health	1.269***	1.346***	0.733***	0.779***	1.116***	1.146***	1.277***	1.147***
Poor Health	0.831***	0.777***	0.403**	0.515**	0.750***	0.807***	0.831***	0.729**
Age	-0.006	-0.032*	-0.034**	-0.039**	-0.015	-0.023	-0.043**	-0.055**
Age-Squared	0.000	0.000**	0.001***	0.001***	0.000	0.000*	0.001***	0.001***
Male	-0.009	-0.003	0.059	0.082	0.052	0.116	0.020	0.075
Self-Employed	0.403**	0.406*	0.577***	0.435**	0.365*	0.420*	0.415**	0.544**
Employee	0.388**	0.408**	0.567***	0.424**	0.387**	0.444**	0.436**	0.628**
Retired	0.515**	0.452*	0.572**	0.316	0.694***	0.647**	0.511**	0.477*
Maternity Leave	0.786	0.903	0.566	1.028	1.607**	0.832	2.535**	2.715**
Family Care	0.075	0.099	0.546***	0.372*	0.179	0.150	0.249	0.486**
Sick	-0.063	-0.100	0.264	0.048	-0.268	-0.163	0.102	0.172
Government Training Scheme	(omitted)	(omitted)	0.150	0.083	-0.122	1.266	0.614	(omitted)
Full-Time School	0.461	0.465	0.640*	1.053**	0.620	0.677	1.173**	1.433***
Married	0.535***	0.553***	0.567***	0.586***	0.383***	0.418***	0.390***	0.428***
Widowed	0.613***	0.531**	0.114	0.146	-0.078	-0.155	-0.103	-0.142
Single	0.309**	0.292**	0.354**	0.372**	0.135	0.240	0.091	0.242
England	-0.101	-0.117	-0.011	0.044	-0.076	-0.053	-0.224**	-0.148
Wales	-0.193**	-0.199*	-0.011	-0.071	-0.025	-0.079	-0.169	-0.185
Constant	2.815***	3.365***	2.715***	2.873***	2.827***	3.312***	2.534***	2.659***
Observations	1,644	1,230	1,569	1,170	1,501	1,118	1,393	1,021
Mean Life Satisfaction	4.875		4.918		4.901		4.900	
F-Statistic	18.16	15.43	17.71	12.65	18.56	13.43	17.80	14.36
Adjusted R^2	0.187	0.205	0.197	0.186	0.212	0.204	0.217	0.224

Note: Reference group are smokers who do not change the number of cigarettes they smoke daily, who are unemployed, female, have very poor health, are separated/divorced and who live in N. Ireland. *, **, *** indicates statistical significance at the 10, 5 and 1% level.

The OLS regression results for 2005-2008 are presented in Table 6. In all years the age and age-squared terms reveal a U-shaped relationship with life satisfaction, confirming previous findings. Self-employed, employed and retired smokers are all significantly more satisfied with life relative to unemployed smokers, ceteris paribus. Adult equivalent gross household income is insignificant in all three years, although it is always positive.

For smokers we observe no significant effect of a change in the quantity of cigarettes consumed on life satisfaction between 2004-05, 2005-06 and 2007-08. When smokers reduce their number of cigarettes between 2006 and 2007, their life satisfaction score declines significantly, by 0.17 points on the 1-7 satisfaction scale. When the model is estimated for just heavy smokers (who comprise the majority of smokers) the decline is again significant at the 5 per cent level, with a slight increase in size to 0.18 points. This is consistent with the idea that smokers feel their individual liberties are threatened by the ban, and is interpreted as being a rational response from a Beckerian perspective. Given the evidence from the Smoking and Behaviour Survey (ibid) it is likely this negative effect is caused by the ban on smoking in pubs. Results not reported here use job satisfaction of employees instead of life satisfaction in order to observe whether the smoking ban in the workplace has affected job satisfaction. There is no significant correlation between the smoking variables and job satisfaction. In 2008 the sign on decreasing smoking is positive and is significant at the 10 per cent level for heavy smokers. This is unexpected since set-point theory would predict either a continued but lower negative effect or no effect.

Given some smokers in the analyses so far could subsequently have dropped out of the sample in later years, we also run estimations for those individuals who smoked in every year between 2004 and 2008. These smokers are very present-orientated and given the previous findings the ban is expected to have a greater impact on them. Table 7 confirms this with there being a slightly greater impact on happiness (-0.18 points) for smokers who decreased their cigarette consumption in 2007. For heavy smokers the reduction in satisfaction is of the order of 0.21 points. The positive impact of reducing smoking amongst heavy smokers in 2008 is found here too, but this time the positive impact is of the scale of +0.22 points and is significant at the 5 per cent level.

The present orientation of heavy smokers could indicate an underlying risk-taking personality that contributes to how many cigarettes are smoked. There are no consistent controls for risk-aversion or risk-taking behaviour in the BHPS. In some of the years there is a question on trusting behaviour that could proxy for risk-taking attitude. In 2008 there are two specific questions on risk-taking attitudes, *'Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?'* and *'Are you generally a person who is fully prepared to take risks in trusting strangers or do you try to avoid taking such risks?'*. Respondents have a 1-10 scale to choose from where lower values indicate risk-aversion. There is no objective measure of risk-aversion available.[10]

Table 7: Ordinary Least Squares Regressions

	2005		*2006*		*2007*		*2008*	
Dependent variable = life satisfaction	*(1) All Smokers*	*(2) Heavy Smokers, >9 cigarettes a day*	*(3) All Smokers*	*(4) Heavy Smokers, >9 cigarettes a day*	*(5) All Smokers*	*(6) Heavy Smokers, >9 cigarettes a day*	*(7) All Smokers*	*(6) Heavy Smokers, >9 cigarettes a day*
Smoker increases cigarette consumption	0.033	0.049	0.007	0.019	-0.015	-0.017	0.035	-0.025
Smoker decreases cigarette consumption	-0.049	-0.079	0.045	0.093	-0.172**	-0.214**	0.149	0.221**
Log Household Income (Adult Equivalent)	-0.034	-0.043	0.058	0.033	0.038	-0.064	0.103	0.108
Excellent Health	2.238***	2.267***	1.730***	1.673***	2.022***	2.005***	2.175***	2.181***
Good Health	1.948***	1.991***	1.427***	1.391***	1.752***	1.722***	1.778***	1.800***
Fair Health	1.429***	1.525***	0.857***	0.904***	1.135***	1.210***	1.125***	1.154***
Poor Health	0.923***	0.917***	0.509**	0.582**	0.807***	0.853***	0.640**	0.670**
Age	-0.002	-0.024	-0.046**	-0.050**	0.004	-0.002	-0.031*	-0.044**
Age-Squared	0.000	0.000	0.001***	0.001***	0.000	0.000	0.000**	0.001**
Male	-0.082	-0.091	0.063	0.090	0.066	0.106	0.077	0.111
Self-Employed	0.369*	0.438*	0.546**	0.426*	0.402*	0.490*	0.417*	0.590**
Employee	0.377**	0.443**	0.511**	0.435**	0.360*	0.440**	0.524**	0.685***
Retired	0.603**	0.604**	0.404*	0.214	0.580**	0.563**	0.585**	0.568**
Maternity Leave	0.679	0.963	0.882	1.398	1.393	(omitted)	2.654**	2.767**
Family Care	0.073	0.103	0.471**	0.372*	0.154	0.125	0.341	0.561**
Sick	0.016	-0.014	0.312	0.133	-0.258	-0.172	0.162	0.240
Government Training Scheme	(omitted)	(omitted)	0.135	0.127	(omitted)	(omitted)	0.670	(omitted)
Full-Time School	0.580	0.770*	0.505	0.865*	0.704	0.734	1.116**	1.350***
Married	0.539***	0.591***	0.604***	0.647***	0.464***	0.460***	0.375***	0.354***
Widowed	0.516**	0.550**	0.158	0.193	0.022	-0.037	-0.079	-0.167
Single	0.388**	0.376**	0.373**	0.416**	0.299**	0.346**	0.114	0.239
England	-0.089	-0.123	0.082	0.133	-0.134	-0.085	-0.248**	-0.163
Wales	-0.155	-0.161	0.105	0.032	-0.080	-0.095	-0.174	-0.181
Constant	2.569***	3.019***	2.793***	3.010***	2.248***	2.905***	2.438***	2.376***
Observations	1,252	988	1,228	968	1,232	966	1,173	907
F-Statistic	14.090	13.22	12.95	10.23	15.76	12.70	15.03	12.49
Adjusted R^2	0.187	0.214	0.183	0.180	0.209	0.203	0.216	0.218

Note: Reference group are smokers who do not change the number of cigarettes they smoke daily, who are unemployed, female, have very poor health, are separated/divorced and who live in N. Ireland. *, **, *** indicates statistical significance at the 10, 5 and 1% level.

Given personality traits are fixed over short periods of time we use information from 2008 as controls for the same individuals in 2007. Appendix A presents re-estimates of satisfaction equations for 2007 and 2008, controlling for personality traits. In 2007, the size of the smoking variables changes very little and the significance remains unchanged. In 2008, for all smokers and heavy smokers there is a slight decrease in significance when personality traits are added to the model, but our findings remain robust.

The change in sign that decreasing cigarette consumption has on the satisfaction of smokers, but more specifically heavy smokers, could be due to smokers deciding to voluntarily reduce cigarette consumption a year after the introduction of the ban. In order to understand the relationship we estimate a model which controls for changes in cigarette consumption over three years. The new variables are defined as:

$$S_{r,r} = 1 \quad if \quad S_{2007} < S_{2006} \quad \& \quad S_{2008} < S_{2007}$$

$$S_{no\ \Delta,r} = 1 \quad if \quad S_{2007} = S_{2006} \quad \& \quad S_{2008} < S_{2007}$$

$$S_{i,r} = 1 \quad if \quad S_{2007} > S_{2006} \quad \& \quad S_{2008} < S_{2007}$$

$$S_{no\ \Delta,no\ \Delta} = 1 \quad if \quad S_{2007} = S_{2006} \quad \& \quad S_{2008} = S_{2007}$$

$$S_{r,no\ \Delta} = 1 \quad if \quad S_{2007} < S_{2006} \quad \& \quad S_{2008} = S_{2007}$$

$$S_{i,no\ \Delta} = 1 \quad if \quad S_{2007} > S_{2006} \quad \& \quad S_{2008} = S_{2007}$$

$$S_{r,i} = 1 \quad if \quad S_{2007} < S_{2006} \quad \& \quad S_{2008} > S_{2007}$$

$$S_{no\ \Delta,i} = 1 \quad if \quad S_{2007} = S_{2006} \quad \& \quad S_{2008} > S_{2007}$$

$$S_{i,i} = 1 \quad if \quad S_{2007} > S_{2006} \quad \& \quad S_{2008} > S_{2007}$$

Where 'r' indicates a reduction in cigarettes, 'i' is an increase and 'no Δ' is no change in consumption. Table 8 provides the estimations using these variables for 2007 and 2008. For the 2008 sample none of the new variables are significant at the 10 per cent level, but the largest coefficients are for those who reduce their cigarette consumption in 2008 compared with increasing consumption in 2007 or not changing their consumption in 2007. In 2007 the results show that both those smokers who reduced cigarette consumption in consecutive years, and those who reduced consumption after not changing their consumption previously, are significantly less happy compared to smokers who did not change cigarette consumption at all. The latter group picks up the negative impact of the smoking ban on smokers happiness.

Table 8: Ordinary Least Squares

Life Satisfaction	*2007*	*2008*
$S_{r,i}$	-0.036	0.025
$S_{r,r}$	-0.317*	0.099
$S_{r,\ no\ \Delta}$	-0.164	0.054
$S_{i,i}$	-0.084	-0.003
$S_{i,r}$	-0.171	0.224
$S_{i,\ no\ \Delta}$	-0.057	0.022
$S_{no\ \Delta,\ i}$	-0.034	0.089
$S_{i,\ no\ \Delta}$	-0.375**	0.155
Log Household Income (Adult Equivalent)	-0.031	0.041
Excellent Health	1.844***	1.997***
Good Health	1.554***	1.700***
Fair Health	1.017***	1.064***
Poor Health	0.712***	0.642**
Age	0.002	-0.029
Age-Squared	0.000	0.001**
Male	0.022	-0.017
Self-Employed	0.288	0.338
Employee	0.309	0.510**
Retired	0.647**	0.448*
Maternity Leave	(omitted)	1.850
Family Care	0.000	0.389*
Sick	-0.385	0.153
Government Training Scheme	(omitted)	0.730
Full-Time School	0.420	0.973**
Married	0.406***	0.390***
Widowed	-0.282	-0.022
Single	0.271*	0.203
England	-0.139	-0.270**
Wales	-0.102	-0.257**
Risk taking	0.084***	0.124***
Risk taking (stranger)	-0.011	-0.016
Trust	0.111	0.298***
Is religion important	0.001	-0.035
Constant	2.618***	2.210***
Observations	1,034	1,068
F-Statistic	10.96	11.89
Adjusted R^2	0.230	0.252

Note: The number of observations for 2007 declines by 98. This is due to missing values for the personality traits in 2007 that are cleaned from the working sample.

5. SUMMARY

This paper contributes to the literature on happiness and the literature on smoking by testing whether the smoking ban in the UK resulted in any changes in cigarette consumption, and whether these changes impacted at all on happiness. The smoking ban did not result in any significant change in happiness scores of smokers and non-smokers. Non-smokers are significantly happier than smokers. When just smokers were analysed, it became apparent that in 2007 heavy smokers in particular who decreased their cigarette consumption felt significantly less happy. Neither size of the effect, nor significance, was repeated in previous years or the year after the ban. This suggests that smokers felt aggrieved by the ban and this impacted on their happiness, similar to how the rational addiction theory of smoking predicts smokers react after a price increase. In order to check for robustness we added personality traits to the model in order to capture risk-aversion, with smokers being more present orientated because they are risk-takers. When these underlying variables were added the main findings did not change. In order to isolate the effect of the ban on happiness we controlled for change in smoking over consecutive years. It was found that for those who smoked throughout the 2005-2008 period, those smokers who reduced smoking in 2007 compared to 2006 but had not changed their smoking intake from 2005 to 2006 reported significantly less happiness. There is tentative support for the view that any negative impact was only temporary, and that a year later smokers who reduced their cigarette intake were happier. This finding could reflect the changing view on the smoking ban as something that is good for smokers' happiness and that smokers may have taken sometime to realise this, but now feel happier as a result.

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APPENDIX

Table A1: Ordinary Least Squares

	2007					
	Include personality traits			*Exclude personality traits*		
Life satisfaction	*Smokers*	*Heavy Smokers*	*Light Smokers*	*Smokers*	*Heavy Smokers*	*Light Smokers*
Smoker increases cigarette consumption	-0.005	-0.038	0.154	-0.018	-0.052	0.106
Smoker decreases cigarette consumption	-0.212**	-0.244**	-0.067	-0.216**	-0.253**	-0.030
Log Household Income (Adult Equivalent)	-0.032	-0.073	0.276	-0.017	-0.061	0.262
Excellent Health	1.837***	1.844***	1.867***	1.920***	1.944***	1.675***
Good Health	1.551***	1.576***	1.461***	1.623***	1.669***	1.247**
Fair Health	1.012***	1.097***	0.564	1.065***	1.172***	0.364
Poor Health	0.704***	0.759***	0.170	0.714***	0.793***	-0.064
Age	0.003	0.006	0.002	-0.001	0.001	0.000
Age-Squared	0.000	0.000	0.000	0.000	0.000	0.000
Male	0.025	0.074	-0.035	0.081	0.121	0.031
Self-Employed	0.293	0.462*	-0.973	0.329	0.502*	-0.986
Employee	0.317	0.444*	-0.564	0.319	0.451**	-0.589
Retired	0.654**	0.717**	0.052	0.622**	0.680**	0.021
Family Care	-0.003	0.142	-0.833	-0.038	0.115	-0.923
Sick	-0.388	-0.209	-1.823**	-0.444*	-0.251	-1.995***
Full-Time School	0.428	0.635	-0.750	0.554	0.726	-0.269
Married	0.409***	0.406***	0.112	0.415***	0.413***	0.084
Widowed	-0.268	-0.240	-0.550	-0.324	-0.299	-0.530
Single	0.281*	0.318*	-0.306	0.286*	0.321*	-0.325
England	-0.138	-0.057	-0.826**	-0.120	-0.044	-0.796**
Wales	-0.100	-0.053	-0.566	-0.077	-0.039	-0.504
Risk taking	0.085***	0.077***	0.112**			
Risk taking (stranger)	-0.014	-0.009	-0.031			
Trust	0.111	0.099	0.046			
Is religion important	0.003	0.014	-0.076			
Constant	2.555***	2.523***	2.485	2.915***	2.868***	3.293*
Observations	1,034	892	142	1,034	892	142
F-Statistic	13.52	10.70	3.96	14.94	11.94	4.36
Adjusted R^2	0.233	0.214	0.344	0.221	0.205	0.333

Note: There were no observations for government training scheme in the working sample. There is a solitary observation for maternity leave in the working sample so this observation was excluded from the analysis..

Table A2: Ordinary Least Squares

	2008					
	Include personality traits			*Exclude personality traits*		
Life satisfaction	*Smokers*	*Heavy Smokers*	*Light Smokers*	*Smokers*	*Heavy Smokers*	*Light Smokers*
Smoker increases cigarette consumption	0.024	-0.035	0.063	0.011	-0.025	-0.025
Smoker decreases cigarette consumption	0.158*	0.201*	-0.118	0.176*	0.212*	-0.128
Log Household Income (Adult Equivalent)	0.041	0.064	-0.100	0.080	0.106	-0.077
Excellent Health	2.004***	2.002***	1.978**	2.153***	2.169***	2.202**
Good Health	1.711***	1.724***	1.407*	1.763***	1.786***	1.536*
Fair Health	1.073***	1.132***	0.366	1.080***	1.145***	0.492
Poor Health	0.651**	0.698**	0.421	0.633**	0.670**	0.603
Age	-0.030*	-0.030	-0.033	-0.040**	-0.042*	-0.044
Age-Squared	0.001**	0.001**	0.001	0.001***	0.001**	0.001
Male	-0.013	0.014	-0.146	0.076	0.117	-0.125
Self-Employed	0.339	0.492*	-0.549	0.425*	0.588**	-0.499
Employee	0.507**	0.608**	0.058	0.582***	0.685***	0.088
Retired	0.447*	0.565**	-0.103	0.493**	0.592**	-0.152
Maternity leave	1.840	1.852	(omitted)	2.694**	2.772**	(omitted)
Family Care	0.390	0.594**	-0.945	0.365*	0.567**	-1.028
Sick	0.157	0.213	0.205	0.166	0.217	0.267
Government training	0.774	(omitted)	0.634	0.683	(omitted)	0.369
Full-Time School	0.971**	1.120**	-0.551	1.157**	1.346**	-0.582
Married	0.392	0.348**	0.583*	0.398***	0.352**	0.607
Widowed	-0.023	-0.078	0.528	-0.104	-0.187	0.392
Single	0.198	0.276*	-0.108	0.164	0.236	-0.106
England	-0.269**	-0.188*	-0.841**	-0.230**	-0.153	-0.796**
Wales	-0.252	-0.204	-0.560*	-0.214*	-0.172	-0.565
Risk taking	0.123***	0.137**	0.032			
Risk taking (stranger)	-0.014	-0.010	-0.008			
Trust	0.295**	0.280**	0.380*			
Is religion important	-0.032	-0.028	-0.093			
Constant	2.232***	1.785**	5.278**	2.708***	2.350***	5.267***
Observations	1,068	906	163	1,068	906	163
F-Statistic	14.58	13.16	3.13	14.12	12.43	3.51
Adjusted R^2	0.256	0.259	0.255	0.221	0.218	0.254

Note: There were no observations for government training scheme in the working sample. There is a solitary observation for maternity leave in the working sample so this observation was excluded from the analysis..

ENDNOTES

1. Timothy Hinks, Department of Accounting, Economics and Finance, University of West of England, Coldharbour Lane, Bristol BS16 1QY. E-mail: timothy.hinks@uwe.ac.uk. Andreas Katsaros, Ministry of Finance, Athens, Greece. We are grateful to two anonymous referees for helpful comments on previous versions of this paper.

2. Currently the dominant view is that both quality of life and subjective well-being are umbrella terms (see, for example, World Health Organisation Quality of Life Group, 1995 and Diener, 2006). Happiness is normally defined as positive affect but can also be thought of as a universal evaluation of a person's life satisfaction (Camfield and Skevington 2008, p768). Life satisfaction is thus a subordinate term to the general concept of happiness.

3. A number of books have been written on the subject including Layard (2005), Frey and Stutzer (2002) and Easterlin (2010).

4. A similar concept to set-point is the hedonic treadmill (Brickman and Campbell, 1971).

5. The sample here decreases over time due to attrition and the number of smokers declining.

6. When Scotland is included in our models, the various smoking coefficients are smaller, although their signs and significance levels do not change.

7. To calculate this range, simply maximise satisfaction with respect to age and solve for age.

8. More recent evidence using experimental, panel and cross-sectional methodologies from Alpizar, Carlssom and Johansson-Stenman (2005), Clark, Frijters and Shields (2008) and Knight and Gunatilaka (2010) respectively find that relative positions within society are more important factors than income itself.

9. Some of the difference in average age is expected given the health issues of smoking. Sample attrition will effect both smokers and non-smokers so this is not a feasible explanation of the average age difference.

10 Hartog, Ferrer-i-Carbonell and Jonker (2000) propose a simple expected lottery win question to be included in surveys to provide an objective measure of risk-aversion.

REFERENCES

Akerlof G (1991) 'Procrastination and obedience', *American Economic Review*, 81, 1-19.

Alpizar F, Carlsson F and Johansson-Stenman O (2005) 'How much do we care about absolute versus relative income and consumption?', *Journal of Economic Behavior and Organisation*, 56(3), 405-421.

Baltagi B and Griffen J M (2002) .Rational addiction to alcohol: panel data analysis of liquor consumption', *Health Economics*, 11(6), 485-491.

Becker G S and Murphy K M (1988) 'A Theory of Rational Addiction', *The Journal of Political Economy*, 96(4), 675-700.

Becker G S, Grossman M and Murphy K M (1994) 'An Empirical Analysis of Cigarette Addiction', *American Economic Review*, 84(3), 396-418.

Blanchflower D G, Oswald A J and Warr P B (1993) 'Wellbeing over time in Britain and the USA', paper presented at an Economics of Happiness Conference, London School of Economics.

Brickman P and Campbell D T (1971) 'Hedonic relativism and planning the good society' in Appley M H (ed) *Adaptation level theory: A symposium*, New York: Academic Press.

Camfield L and Skevington S M (2008) 'On subjective well-being and quality of life', *Journal of Health Psychology*, 13(6), 764-775.

Colman G, Grossman M and Joyce T (2003) 'The effect of cigarette excise taxes on smoking before, during, and after pregnancy', *Journal of Health Economics*, 22(6), 1053-1072.

Clark A E and Oswald A J (1996) 'Satisfaction and Comparison Income', *Journal of Public Economics*, 61, 359-381.

Clark A E (2003) 'Unemployment a Social Norm: Psychological Evidence from Panel Data', *Journal of Labor Economics*, 21(2), 323-351.

Clark A E, Frijters P and Shields M A (2008) 'Relative income, happiness, and utility: An explanation for the Easterlin paradox and other puzzles', *Journal of Economic Literature*, 46(1), 95-144.

Diener E (2006) 'Guidelines for national indicators of subjective well-being and ill-being', *Journal of Happiness Studies*, 7(4), 397-404.

Easterlin R (1974) 'Does Economic Growth Improve the Human Lot? Some Empirical Evidence', in David P A and Reder M W (eds) *Nations and Households in Economic Growth: Essays in Honor of Moses Abramowitz*, NY: Academic Press.

Easterlin R (2010) *Happiness, Growth and the Life-Cycle*, Oxford: Oxford U P.

Ferrer-i-Carbonell A and Frijters P (2004) 'How important is methodology for the estimates of the determinants of happiness?', *Economic Journal*, 114, 641-659.

Foster M and Jones A M (2001) 'The role of tobacco taxes in starting and quitting smoking: Duration analysis of British data', *Journal of the Royal Statistical Society*, 164(3), 517-547.

Frey B S and Stutzer A (2002) *Happiness and Economics*, Princeton: Princeton U P.

Gardner J and Oswald A J (2007) 'Money and mental wellbeing: A longitudinal study of medium-sized lottery wins', *Journal of Health Economics*, 26(1), 49-60.

George D (2004) *Preference Pollution: How Markets Create the Desires we Dislike*, Michigan: University of Michigan.

Grossman M (2004) 'Individual Behaviors and Substance Use: The Role of Price', National Bureau of Economic Research, Working Paper 10948.

Grossman M, Sindelar J L, Mullahy J and Anderson R (1993) 'Policy Watch: Alcohol and Cigarette Taxes', *Journal of Economics Perspectives*, 7(14), 211-222.

Gruber J and Mullainathan S (2005) 'Do cigarette taxes make smokers happier?', *Advances in Economic Analysis and Policy*, Berkeley Electronic Press, 5, 1412-1421.

Hartog J, Ferrer-i-Carbonell A and Jonker N (2000) 'On a simple survey measure of individual risk aversion', Centre for Economic Studies, CESifo Working Paper Series No. 363.

Kabat G C and Wynder E L (1987) 'Determinants of Quitting Smoking', *American Journal of Public Health*, 77, 1301-1305.

Kahneman D, Knetsch J L and Thaler R H (1991) 'Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias', *Journal of Economic Perspectives*, 5(1), 193-206.

Knight J and Gunatilaka R (2010) 'The Rural-Urban Divide in China: Income but not Happiness?', *Journal of Development Studies*, 46(3), 506-534.

Layard R (2005) *Happiness - Lessons from a new science*, London: Penguin.

Lucas R E, Clark A E, Georgellis, Y and Diener E (2004) 'Unemployment Alters the Set Point for Life Satisfaction', *Psychological Science*, 15(1), 8-13.

Office for National Statistics (2008) 'Smoking Related Behaviour and Attitudes, 2008/09', Opinions Survey Report No. 40.

Oswald A J and Powdthavee N (2008) 'Does happiness adapt? A longitudinal study of disability with implications for economists and judges', *Journal of Public Economics*, 92(5-6), 1061-1077.

Powell L M, Tauras J A and Ross H (2005) 'The Importance of Peer Effects, Cigarette Prices and Tobacco Control Policies for Youth Smoking Behavior', *Journal of Health Economics*, 24, 950-968.

Saffer H and Chaloupka F (2000) 'The effect of tobacco advertising bans on tobacco consumption', *Journal of Health Economics*, 19, 1117-1137.

Thaler R H and Shefrin H M (1981) 'An Economic Theory of Self-Control', *Journal of Political Economy*, 89(2), 392-406.

Tversky A and Kahneman D (1991) 'Loss Aversion in Riskless Choice: A Reference-Dependent Model', *Quarterly Journal of Economics*, 106(4), 1039-1061.

WHOQOL Group (1995) The World Health Organization Quality of Life Assessment (WHOQOL): Position paper from the World Health Organization. Social Science and Medicine, 41(10), 1403-1409.

Winston G C (1980) 'Addiction and Backsliding: A Theory of Compulsive Consumption', *Journal of .Economic Behaviour and Organisation*, 1, 295-324.