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NUMBER 46

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THE ECONOMICS
AND
MARKETING OF
TOBACCO

AN OVERVIEW OF THE
EXISTING PUBLISHED
EVIDENCE

RICHARD LAYTE
HELEN RUSSELL
SELINA MCCOY



THE ECONOMIC AND SOCIAL RESEARCH INSTITUTE

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EXECUTIVE SUMMARY

1. The ESRI was commissioned in 2001 by the Office of Tobacco Control to produce a comprehensive literature review of the economics and marketing of tobacco in Ireland.
2. Literature was sourced through discussions with professionals in the fields of public health, marketing and economics; through systematic review of electronic data sources; and through electronic and manual searches of the library systems of Dublin universities.
3. The report focuses on six distinct topics under the following headings:
 - Is the consumption of tobacco related to its price?
 - Income, education and tobacco usage.
 - Cost/benefit analyses of tobacco usage.
 - The advertising and marketing of tobacco products.
 - The economics of smoking among children.
 - Evidence from the 1998 Living in Ireland Survey (LIS).
4. The salient findings of the review are set out in the following paragraphs.
5. One of the primary and consistent critical findings across all areas (Chapter 1) is that research on the economics and marketing of tobacco in Ireland is very underdeveloped (p. 3).
6. The relationship between income, price and tobacco consumption has received a certain amount of treatment but the effects of marketing and health education on tobacco consumption has received almost no systematic or scientific attention.
7. The report suggests that more funding should be directed at research in these areas and concentrated efforts should be made to foster research interest in them.
8. In the economic literature reviewed (Chapter 2) the investigation of the relationship between price and consumption is bedeviled by differences in the assumptions and methodologies employed by various researchers over the past four decades.

However, more recent investigations by Conniffe (1994) have examined the implications of different methodologies and has consequently produced more stable estimates of the price elasticity (-.39) (p. 11).

9. There are two main conclusions to be derived from the economic literature in terms of policy implications.

First, price alone does not account for the fall in tobacco consumption since the 1960s. Health promotion, health education and tobacco restrictions are also likely to have had an effect in terms of reduced consumption (p. 11).

This does not mean that price is not an effective mechanism for reducing consumption, nor that its effects are uniform across the population. But reliance on price alone would require extremely large increases in excise duties.

Second, Irish data does not offer support for rational addiction explanations of tobacco consumption (p. 12). This suggests that consumers are fairly shortsighted in their smoking behaviour and unlikely to assess the long-term health risks or the impact of future price increases.

10. Differences in assumptions and methodologies also complicate the analysis of literature on the relationship between income and tobacco consumption (Chapter 3). It is clear, however, that at some point after 1960 the income elasticity of demand for tobacco changed and became negative. Higher incomes are now associated with a lower propensity to smoke.
11. Clear socio-economic class differentials in smoking suggest that factors other than income, education, and tobacco restrictions may be retarding smoking cessation amongst working class groups (p. 22). This has important implications for health promotion, which at present has individual behavioural change as its aim.
12. The literature suggests that structural socio-economic conditions such as low income, deprivation, unemployment and limited control over life circumstances may increase fatalism and/or heighten levels of stress, both of which may influence smoking behaviour. The welfare impact of taxation on tobacco products is a matter of ongoing debate. Different models equally consistent with the empirical evidence yield contrary welfare outcomes for smokers rendering it difficult to draw firm conclusions about the effects of taxation policies.
13. The results of cost-benefit analysis of tobacco usage (Chapter 4) are critically dependent on the selected parameters, assumptions and specified desired outcomes.

A substantial report by Conniffe (1994) recommended that the focus of analysis should not be on the present balance of costs and benefits but should start from the fact that smoking is demonstrably injurious to health and therefore the elimination or reduction of smoking is the desired outcome. It is the economic consequences of pursuing this objective which ought to be assessed (p. 29).

14. The implications of a hypothetical one-third decrease in smoking prevalence to be achieved by price change alone were examined from a narrow exchequer viewpoint in terms of the changing balance of costs and benefits over time (pp. 29, 32).

15. The link between advertising/marketing and tobacco consumption (Chapter 5) is complex. International literature supports the view that there is an impact but the size of the effect is still the subject of much debate.

The most striking finding is the almost complete absence of research on the Irish situation and the consequent need for investigation to further inform the policy-making process (p. 41).

Public policy formation in Ireland has hitherto been heavily dependent on international experience with particular reference to countries with similar demographics, tobacco production and marketing.

In particular, longitudinal research which can measure exposure to tobacco marketing before take up is necessary to develop knowledge on the impact of tobacco industry strategies to increase smoking amongst young people (p. 42).

16. The literature on the economics of smoking among children and young people (Chapter 6) shows that while estimates vary, the consensus is that they are more responsive to changes in cigarette prices than adults (p. 52).

17. It is not clear whether the effects of cigarette prices vary according to the aspect of smoking being examined: smoking initiation, frequency, duration/cessation (p. 55).

There is an absence of evaluative research on the effectiveness of primary and post-primary school health education programmes.

More research specifically related to the Irish context is needed to evaluate the potential effects of price changes on the initiation, prevalence and cessation of smoking amongst the young. Quantification of effects in this area would be of considerable importance to the policy formation process.

18. Hitherto unpublished results from The Economic and Social Research Institute's Living in Ireland Survey are examined in Chapter 7.

At the request of Eurostat the ESRI's (1998) LIS included questions on smoking behaviour. The large sample size of the LIS enables a variety of detailed statistical analyses to be performed on population sub-groups.

The results reveal that while men have a higher probability of smoking compared to women, young women have a particularly high rate of smoking compared to young men, a reverse of the historical pattern. This is consistent with other Irish and UK research.

19. Multivariate analysis of the results revealed that income becomes insignificant in the presence of social class and education suggesting that these factors are of greater importance in relation to smoking. Additionally, a measure of psychological stress shows that levels are positively related to the possibility of smoking, even after controlling for income, education and social class.
20. The LIS results show that although income is inversely related to the probability of smoking, among smokers, income is no longer related to smoking to any significant degree (p. 67).

21. In summary the key points arising from the review are three:

First, the requirement for considerably more research, in the topical areas considered, on the efficacy of the various policy instruments available to government in controlling the promotion and use of tobacco products.

Second, price increases, in particular, can yield measurable reductions in smoking and these reductions are biased toward children and adolescents.

Third, that, on the basis of existing research findings, currently available policy instruments are all capable of making a contribution to the reduction of tobacco consumption and it would be premature and inappropriate to eliminate any policy instrument from consideration or application without compelling reasons for so doing.

1. INTRODUCTION

In this report we examine a wide range of literature published in Ireland on the economics and marketing of tobacco and assess the evidence that this presents on a range of issues. In doing so we aim to provide an overview of current research and conclusions reached as well as identifying gaps in research that require attention. Throughout the report we have endeavoured to examine and assess a wide range of sources from academic literature and government reports to so called "grey sources" such as newspapers, trade magazines and professional journals.

There are many dimensions to the economics and marketing of tobacco in Ireland, but the sheer size of the industry and the amounts spent on this item are a good start. Each year around six billion cigarettes are smoked in the Republic of Ireland as well as 322 thousand kilos of other tobacco products. In total, consumers spent roughly €1,869 million on tobacco products in the year 2000, almost 4 per cent of all personal expenditure. Though estimates of both the number of regular smokers and the amount that they smoke is not very precise, the percentage of regular smokers (more than one cigarette per day) in the adult population is somewhere between 28 and 30 per cent, each one consuming an average of 21 cigarettes. We know from research however, that smoking is not confined to adults and that by the late teenage years, the percentage smoking almost equals the proportion of adult smokers, although a far higher number will have tried smoking.

Yet there is no doubt that smoking causes a number of serious illnesses and is the largest cause of premature deaths in Ireland, approximately 7,000 a year. Because of this, one of the major themes of economic research on tobacco in Ireland and elsewhere is the relationship between the price of cigarettes and their consumption. The answer to this question has important implications since if consumption falls as price rises then increasing prices through taxation will be a useful policy lever in the hands of those seeking to reduce the amount of chronic illness and premature death caused by this product. This question is itself multi-faceted since different groups in society will have larger or smaller incomes and so will be more or less sensitive to changes in price. For example, if the majority of smokers start smoking in their teenage years and teenagers tend to have less income than adults, the issue of the price/consumption relationship has even greater importance.

Cost however, is by no means the only influence on the consumption of tobacco. As we have just noted, income has a role, but anti-smoking health campaigns, tobacco advertising/marketing and restrictions on these also play a part. In recent years restrictions on smoking advertising have become stricter, but there are many other means through which tobacco products can be marketed and maximising the value of these media has been the task of the marketing industry.

Governments have not been slow to realise both the health and revenue raising effects of taxes on tobacco and this is one aspect of a third major theme in the literature on the economics of tobacco – the costs and benefits of smoking. Although most people would now accept that smoking is the major cause of disease and premature death, the taxes raised from tobacco sales are considerable and represent a major incentive to government not to unduly restrict tobacco usage or price it out of people's reach. The central question is: does the large amount of money which government receives in the form of taxes on tobacco sales exceed the "cost" to the country of the health consequences? This is a difficult question; aside from the problems associated with quantifying the proportion of illness caused and the cost of this to health services, should we also try to quantify the suffering caused to individuals and families by tobacco usage? Moreover, should we also include in the total costs the days of work and productivity lost through ill health caused by smoking? As we will go on to see, the balance of costs and benefits is hugely sensitive to the assumptions made about what should be placed on the scales and the ultimate aim of such an exercise should be questioned.

In this report we first examine the literature that has been published in the Irish context on these themes and others, and attempt to give an evaluation of the quality of this literature. Literature was accessed using a variety of techniques from discussions with those working in the area of public health, marketing and economics to electronic and manual searches. To search electronic data sources, the techniques of systematic review were used on databases such as Medline, PsychLit, Sociofile and EconLit. This involves using a series of key words in combinations to systematically cover the subjects and titles of available published material. Electronic and manual searches were also made of the library systems of the Dublin Universities. These searches revealed a large collection of material published in Ireland, though some areas were the subject of rather more literature than others and overall research on the economics and marketing of tobacco in Ireland was very underdeveloped. For example, although there are still many unanswered questions, the price/consumption relationship has gained some attention in the academic economic literature whereas the effect of marketing, or health education on consumption has received almost no systematic or scientific attention. This is an unfortunate situation given the importance of smoking for public health and suggests that rather more funding should be directed at research in these

areas and concerted efforts should be made to foster research interest. Throughout this review we have made a point of remarking upon those areas where research is scant as well as evaluating the research that is available.

The review is structured as follows: in the next chapter we examine the work that has been published in Ireland on the relationship between the price of tobacco and the level of consumption. As just discussed this is a large question that has important consequences for health professionals and policy makers.

Price is not however, the only influence on the level of tobacco consumption. As we will show, a strong case could be made that health education has had far more influence on the extent of and level of smoking in the recent past and this has led to an interesting inverse relationship between the level of income of a person and their probability of smoking. In Chapter 3 we investigate this relationship using Irish literature to draw out the implications for tobacco policy.

In Chapter 4 we move on to an assessment of the Irish literature on the issue of the level of tax on tobacco and the contentious question of whether the high level of revenue raised from tobacco sales, plus its indirect effect on the demand for health care and social welfare means that tobacco is a net cost or net benefit to society. Just as health education can be seen as one of the principal reasons for the decline in levels of smoking in recent decades, it is argued that the marketing and promotion of tobacco is a primary reason for the maintenance of a significant number of smokers in Irish society and the continual recruitment of new smokers from among the young. In Chapter 5 we examine the literature which has emerged in the Irish context on the marketing and promotion of tobacco products.

Given that the majority of regular smokers take up their habit whilst still in their teens it is not surprising that the subject of tobacco usage among young people is a major issue. In Chapter 6 we draw together a large amount of literature from Ireland on the level of smoking among young people, the extent to which the price/consumption relationship is different for this group and the role of marketing and advertising in promoting smoking.

In Chapter 7 we review some previously unpublished evidence from the 1998 wave of the Living In Ireland Survey (LIS) carried out by The Economic and Social Research Institute. This data allows us to examine a number of the issues discussed in this review using representative data for the Irish population. For instance, LIS has very detailed information on income and occupational status that we can use to investigate the distribution of smoking by sex, age group, social class and income group.

2. IS THE CONSUMPTION OF TOBACCO RELATED TO ITS PRICE?

In this chapter we review the literature published in Ireland on perhaps the core issue in the economic analysis of smoking, the extent to which the consumption of tobacco is related to its price. Though other factors, principally health education, restrictions on advertising and limits on where smoking is allowed may well have as much, or even more effect on the actual level of smoking, it is the effect of price on consumption that has received the most attention in the economic and health economics literature.

Given the large amount of high quality research carried out on this issue both in Ireland and internationally (some in the UK going back to the 1940s), one would imagine that there was a fair degree of consensus at this point as to the nature of the relationship, but this does not seem to be the case. In general the literature agrees that there is some relationship between price and consumption, usually expressed in the form of "elasticities", i.e. the proportion change in the amount of tobacco smoked for a proportionate change in price, but the size of this relationship is disputed, as is the methodology by which the estimate is achieved.

In this chapter we will examine the different approaches taken and different conclusions reached and attempt to assess the possible reasons for their disagreement. Specifically we examine the different data sources that have been used, the assumptions made about the constancy or not of the relationship over time and the role given to addiction as an important influence. The price/consumption relationship would usually be assessed alongside the relationship of income to consumption, primarily because analysts need to hold the latter (as well as other factors) constant within statistical models to get a reliable estimate of the former. However, there are a host of questions within the literature about the income/consumption relationship that deserve a chapter of their own so in this review we leave this subject until the next chapter and concentrate here solely upon how the consumption of tobacco changes with its price. Similarly, we also defer an examination of the crucial question of whether the price/consumption relationship is different for young people until

Chapter 6 when we examine a range of issues in the economics and marketing of tobacco as they relate to young people.

2.1 Developments in Price and Consumption 1960-1990

Before we turn to the work which has been published on the price/consumption relationship, it would be useful first to examine the way in which the both the price of tobacco and the level of consumption have changed over the last few decades since it is this recent history in statistical form which is used to examine the relationship. Data on expenditure on tobacco are available from the Central Statistics Office's *National Income and Expenditure Accounts* and these offer a fairly accurate picture of the real amount of tobacco consumed, except for the impact of tobacco smuggling (though the latter is not insignificant). Nonetheless, these figures expressed at constant prices (i.e. price deflated to take account of price inflation) and represented on a per adult basis show that tobacco consumption has declined from a peak in 1963 to 62 per cent of this value in 1988 with the largest decline occurring between the late 1970s and the late 1980s (all figures in this section are from Conniffe (1994), p. 3.13). What then was happening to tobacco prices over this same period? The same data show that prices rose from 1960 to 1969, then declined substantially in real terms until 1978, before rising almost continuously to their highest point in 1987. This pattern suggests that there may be some relationship given that the largest drop in tobacco consumption coincided with the period of increase in prices, but the relationship is not clear cut given the lack of a fall in consumption during the strong price rise during the 1960s.

If there is a relationship between price and consumption, then it is not straightforward and there are other factors involved, but there does appear to be some correlation between the two factors. We will examine some of these other factors in the next chapter, but here, the important question is – if there is a relationship, what is its magnitude and what implications does this have for the use of price as a tool in anti-smoking policy?

2.2 Price- Consumption Studies

One of the first attempts to measure the price/consumption relationship was a paper by O'Riordan (1969) in *The Economic and Social Review*. This used data referring to Ireland between the years 1953 to 1967 from the Tobacco Research Council in London and related the total weight of tobacco consumed to the price and national income. His main finding was that there was an estimated elasticity between price and consumption of -0.86 , that is, if the price of tobacco were raised by 10 per cent, the amount of tobacco consumed would fall by around 8.6 per cent. This is a relatively large elasticity among smoking studies and if true would mean that consumption is very sensitive to price. However, a later study by McCarthy (1977) came to almost the opposite conclusion. McCarthy used data from the CSO's *National Income and Expenditure Accounts* for a longer period than the data used by

O'Riordan covering the years 1953 to 1974 and found an elasticity of just -0.15 , i.e., a 10 per cent increase in the price of tobacco would induce just a 1.5 per cent decrease in smoking.

Such differences in conclusions are hard to reconcile, but would seem to be mostly due to the different methodologies employed. Apart from the different data sources used, McCarthy also simultaneously estimated demand for a number of different commodities apart from tobacco. This meant that, unlike O'Riordan, he did not attempt to include parameters in his models that represented a changing relationship between tobacco and consumption over time or control for significant other events that occurred over the period of observation such as media and government attention to the health risks involved.¹

A more comparable study to O'Riordan (1969) was that of Walsh (1980) which used similar data to McCarthy (1977), but for a slightly longer time period (1953 to 1976). Unlike McCarthy he concentrated solely on tobacco consumption in the form of weight per adult and related this to price and income, but significantly, he found that a single fitted equation for the whole period was unstable. He found a much better fit using two equations, one for the 1953-1961 period and another for the remaining years to 1976. This yielded an elasticity for the first period that was much closer to O'Riordan's estimate at -0.79 , but a much lower estimate for the second period at -0.38 .

The decreasing elasticity over time does seem to be a recurrent finding with Madden (1993) finding a price elasticity of between -0.33 and -0.68 , though again, differences in methodology make true comparisons difficult (Madden used a model which treated tobacco as one of a set of commodities in a complete breakdown of consumer expenditure). The differences in the results reported in these four studies highlights the importance of the type of model estimated and the assumptions made about the constancy of the elasticity. There are also important differences between studies in the manner in which restrictions on the promotion of tobacco and health reports are modelled, if at all.

It is also interesting that none of these studies attempted to take account of the addictive nature of tobacco products when estimating the extent to which consumption may fall with a price increase. This is an important issue as most regular smokers would attest to the difficulty of giving up, or cutting down on the amount of tobacco smoked and there has been a great deal written internationally on the structure of addiction and how this can be modelled theoretically and methodologically in economics. Addiction is often modelled using a lagged dependent variable, i.e. consumption responds slowly to price change because of addiction. There have also been more sophisticated theoretical approaches to the problem. Young (1983) for instance introduced

¹ The Royal College of Physicians in the UK published a report in 1962 linking smoking and lung cancer and around the same time television advertising of tobacco was banned.

the idea of asymmetric price effects which posit that the effect of a current real decrease in prices can only be reversed in a future period by a larger price increase, the logic being that consumers become addicted to a higher level of consumption and this creates a certain inertia to change.

One of the most interesting attempts to understand the effect of addiction on economic behaviour is that of Becker and Murphy (1988), which posits that smokers are rational in taking up the habit or increasing their smoking and take into account not only the current price, but future price changes since addiction would mean that they are tied into a given level of consumption after some period (i.e. when addiction sets in). Though the assumptions of this are fairly bizarre in that it implies perfect foresight on the part of consumers regarding future price levels, it has received some support in studies in the US and is quoted by US anti-smoking groups because of the higher price elasticities that it produces and the implied effect on current consumption of commitments to future price rises. As Conniffe (1995, p. 345) argues however, the theory would actually seem to suit the needs of the tobacco industry far more since it holds that smokers foresee all the consequences of smoking including the addiction and health consequences.

It was not until the study of Conniffe (1994) that all of these factors were investigated thoroughly in the Irish context as part of a report for the Department of Health and subsequently published in Conniffe (1995). He also used the CSO's *National Income and Expenditure Accounts* for the period from 1960 to 1990 and measured consumption level as expenditure at constant price per person over 14 years. Using both a lagged dependent variable for addiction effects, a decreasing time trend, short and long-run effects and both constant and variable elasticities, Conniffe (1994; 1995) tested a number of hypotheses. Using different formulations for the structure of the elasticity and a lagged dependent variable for addiction effects he found that the price elasticity was fairly stable at around -0.38 which is lower, but quite close to the estimates of Walsh (1980) and Madden (1993).

Most usefully, Conniffe (1995) realised that price can affect both the proportion of smokers in the population as well as impacting on the amount of tobacco smoked by each individual and sought to test this hypothesis. He did this by using time series data on the proportion of smokers to estimate a dual equation model where the first equation relates the proportion of smokers among adults to different factors (here a negative time trend and dummy variables were used to represent restrictions on cigarette advertising) whilst the second relates the quantity consumed to the same variables.

Using this model Conniffe (1995, pp. 342-343) found that the proportion of smokers in the population to be negatively related to price with an elasticity of -0.11 . This means that a 10 per cent price increase would lead to a 1 per cent fall in the proportion of smokers. Price was related to consumption with an elasticity of

around -0.28 which is lower than Walsh (1980) and Madden (1993), but not as low as McCarthy (1977).² That said, the effect of price on the proportion of smokers was insignificant in Conniffe's models, although he stressed that a larger sample of data points may see it become significant. No support was found, however, for the addiction model in the form of a lagged dependent variable with models showing little support for this parameter. Conniffe (1995, p. 344) argued that this did not imply that there were no addiction effects, but that the adjustment to price happens in the short run over a matter of days or weeks rather than years as is assumed in the model when using data lagged by one year.

Conniffe's study did not try to give a break down of price elasticities for those at different points of the income distribution or in different socio-economic groups. It is often held that large price increases are acceptable, despite their regressive nature (i.e. they will take a greater proportion of the income of the poor than the rich) because the poor have a higher price elasticity and will thus stop smoking, or at least cut down to a greater extent than those with more income. This is difficult to test because of data constraints, but has been found in other countries (c.f. Roemer, 1993) and if true in Ireland would have important policy implications.

Using Conniffe's results we can extrapolate that a 10 per cent increase in price will eventually reduce tobacco consumption by around 4 per cent, with around a quarter of this because young people would be deterred from becoming confirmed smokers and existing smokers would be encouraged to stop completely. The remaining 3 per cent would be due to the decreased consumption of tobacco by existing smokers. Extrapolating to the real falls in tobacco consumption in Ireland from 1960 to 1990, he argued that the relatively small size of the elasticities meant that price increases could not be primarily responsible for the fall in consumption during the period and that far more weight should be attached to the influence of health education and restrictions on the advertising of tobacco. Just as importantly, Conniffe (1994; 1995) also examined the rational addiction model, but found very little support for the theory in the Irish context as none of the parameters representing the addiction effects were significant.

2.3 Summary and Policy Implications

The literature that we have reviewed in this chapter has all attempted to define a single number that sums up the tobacco price/consumption relationship – the price elasticity. Yet assessing the differing conclusions in the papers is made more difficult by the various assumptions made and methodologies employed. Whereas O'Riordan (1969) found a strong relationship between price and consumption that would imply that price was a useful

² Expressed as a "long-run" elasticity this is around -0.39 which comes very close to the average of -0.4 found internationally in a recent World Bank publication (Jha and Chaloupka, 1999).

lever for reducing consumption, others found much smaller values leading to the opposite conclusion. However, later papers, notably that of Conniffe (1994) were far more thorough in examining the implications of different methodologies and as such produced more stable estimates in the region of -0.38 . What was clear was that the period after the early 1960s seems to produce a different relationship with the time trend being negative across the period and elasticities falling, i.e. price change led to increasingly small behavioural responses.

Overall, the literature points to two main conclusions in terms of policy implications. First of all, the relatively small effect of price on consumption means that the falls in the levels of consumption during the 1980s were significantly driven by other factors, the most likely being health promotion, health education and tobacco restrictions, rather than price. Consumption of tobacco per adult fell by 30 per cent between 1969 and 1987, but the real price rose by only 6 per cent. The fall in consumption was most probably due to the trend set in motion by health education and tobacco restrictions, since to have engineered the same decrease by price alone would have taken a real price rise of 80 per cent. This implies that these policies should also be more successful in future periods, given the large price rises that would be required to produce significant falls in smoking; though as we will see in Chapter 3, this may not be true for all groups. This does not mean however that price is not a useful means through which to try to decrease tobacco consumption, nor that its effects are uniform across the population. As we will see in Chapter 6 below children are more price sensitive than adults, as might people at the lower end of the income distribution, though we have no Irish data to test the latter with. It would, nonetheless be true that decreasing consumption with price increases alone would take extremely large increases in excise taxes.

The second conclusion is that the models estimated with Irish data did not support the hypothesis of rational addiction. As explained earlier, assuming rational addiction has implications for the policies adopted by government and the culpability of tobacco companies. The fact that the theory did not gain any support in practice suggests that people are fairly "myopic" in their smoking behaviour and will not assess either the long-term risks to health or the impact of future price changes.

In the next chapter we expand on the role that education may play in the consumption of tobacco and examine its relationship to another determinant of smoking, that of personal income.

3. INCOME, EDUCATION AND TOBACCO USAGE

In the last chapter we examined the Irish literature on the relationship between the price of tobacco and its level of consumption. The conclusion of that chapter was that there did seem to be some relationship, i.e. an increase in the price would lead to a decline in the consumption of tobacco, but that the magnitude of the "elasticity" was rather small, particularly between price and the decision to quit, rather than simply lower one's consumption. It was clear that other factors also influence tobacco consumption and were more likely to have been responsible for the large fall in the number of smokers, particularly that between the late 1970s and 1980s. Chief candidate among these factors was the increasing knowledge among the population of the health effects of tobacco cultured in part by government health education campaigns, but also the increasing international evidence on the subject and domestic restrictions on tobacco use. But there was also another factor which had previously been influential in increasing the consumption of tobacco but which in more recent periods has begun to have a rather different relationship to tobacco consumption – that of income.

Standard economic theory would predict that *ceteris paribus*, if people have more money then the demand for a good will rise, and this did indeed seem to be the case with tobacco products until the late 1950s. However, as we will see below, literature suggests that this relation changed in the early 1960s when the income/consumption relationship seemed to become inverse, i.e. the more money someone had the less likely they were to smoke. Figures on the income/consumption relationship tend, however, to be based upon aggregate level data, i.e. government excise and tax receipts, so it could be that the inverse relationship is not due to those with higher incomes stopping smoking or smoking less, but rather the historical drop in smoking rates accompanied over time by an increase in national, per capita income.

But, if tobacco consumption and income are linked in some manner, the question immediately arises of the precise nature of the link and the implications for anti-smoking policies. For example, if simply increasing a person's income leads to them cutting down or even giving up smoking then we should have already seen a natural fall in smoking from the mid-1990s as the income levels of almost all groups in society have risen with the

cross-sectional studies, as in the next section, although some stronger evidence emerges from cross-sectional analyses by Conniffe (1994).

3.2 Income and Consumption – the Cross- Sectional Evidence

Cross-sectional studies use household level information on consumption patterns at a particular point in time and relate these to level of income. Most Irish studies have used the CSO Household Budget Survey (HBS) collected at different points in time as their data source. Though these are not equivalent to time-series estimates since they cannot observe the evolution of the income/consumption relationship over time, we should nonetheless see a similar magnitude and direction of effect.

One of the earliest attempts to use cross-sectional data was Leser's (1962; 1964) analysis of the HBS for 1951-52. He estimated income elasticities for a number of different commodities including tobacco in the 1962 report and found a high elasticity of .83 that was higher even than O'Riordan's in 1969. As with the time-series estimates however, subsequent papers found lower values for the estimates (all using HBS data, but for later surveys). Thus Pratschke (1969) found an elasticity of .59 and Murphy (1976) .35, results which support Walsh's (1980) interpretation, though all remained positive.

Conniffe (1994, p. 3.37) used data from three separate HBS surveys (1973, 1980 and 1987) to examine the income/consumption relationship and did seem to find some supporting evidence that tobacco had now become an inferior good with the elasticity dropping from .35 in 1973 to .23 in 1980 and becoming significantly negative (-.23) by 1987. If the change occurred after 1980 then this is rather later than the date in the early 1960s estimated by Walsh (1980), but would tally with the fundamental decline in sales of tobacco after 1980.

3.3 Smoking, Education and Socio- Economic Status

The last section showed that the relationship between a household's level of income and their consumption of tobacco seemed to change over time and particularly after around 1980. It could be a coincidence that this movement in the income elasticity occurred at the same time as levels of consumption of tobacco were falling sharply and the proportion of smokers in the adult population was continuing the downward trend that began in the early 1960s, but it could also be that the awareness of health issues around smoking were now having an impact. As Conniffe (1994) argued, the real increase in the price of tobacco during the period from the late 1970s to late 1980s was nowhere near large enough to produce this decline, thus was health education having an impact on the level of smoking and if so, will this decline continue? In this section we examine the literature on the effects of health education, but particularly on the now large differential in smoking between socio-economic groups.

Although there had been British publications going back to the mid-1940s which had shown some relationship between smoking and lung cancer, it was the publication of the reports by the Royal College of Physicians in 1962 and the American Surgeon-General in 1965 that finally produced unequivocal evidence about the nature of the relationship and this, along with media coverage, had a profound effect on the public awareness of the risks of tobacco. Because of Ireland's proximity to the UK and close links to the US, such information was bound to have an impact and as we saw earlier, O'Riordan (1969) among others, felt it necessary to include the dates of such publications in their models, or use two equation models that analysed the time series in different sections.

In the Irish context there have been a number of domestic pieces of legislation on tobacco and the implementation of EU legislation such that by the early 1990s there was a strict ban on television and radio advertising of tobacco, a requirement for health warnings on tobacco packaging and a host of other restrictions on where and when people could smoke. At the same time there have been a number of health education campaigns by the Health Promotion Unit of the Department of Health and Children, particularly in the 1990s. These include the *I'm One Less* campaign of 1993-95 on television, radio and billboard aimed at the young, the *Say What you Like - Smoking Kills* campaign of 1995 and the *Break the Habit for Good* campaign from 1998.

Given this increase in the restrictions on tobacco marketing and growing awareness of the health risks it would seem strange if there was not some relationship to the proportion smoking and the amount smoked. The main evidence that we have on the prevalence of smoking in the Irish population come from the Department of Health commissioned surveys from various market research companies from 1972 onward and these show a steady decrease in smoking from 43 per cent in 1972 to 28 per cent in 1990. After 1990 we have to turn to other sources of information, notably the Slán National Health and Lifestyle Survey carried out in 1998 (Friel, Nic Gabhainn, and Kelleher, 1999). This showed a marginal decrease in the proportion of adults who were "regular smokers" to just over 26 per cent suggesting that the decrease that had been observed during the preceding two decades was now slowing markedly.

Although rates of smoking have been decreasing for both men and women, the male rate has been decreasing faster than that for women, the latter partially due to the increasing proportion of young women smoking. In the Slán survey mentioned above, young women (aged 18-34) were found to have higher rates of smoking than young men, historically the group with the highest rates. In Chapter 5 we will examine some of the reasons why this may be, but for the moment, we note that the slow down in the rate of decrease may also be due to that fact that the effectiveness of the health messages used in the health campaigns of the last two decades are no longer as effective as they were and this may

have something to do with the transformation of the income/consumption relationship.

Historical data from Market Research Surveys for the Department of Health (MRBI and Lansdowne Market Research) for Ireland for the period from 1976 to 1993 are discussed by Conniffe (1994, p. 4.15) and show falls in smoking across socio-economic groups, but a larger fall in non-manual groups (30 per cent) compared to semi- and unskilled manual groups (24 per cent). These are similar patterns to those found in the UK (OPCS, 1991) which show that rates of smoking have been consistently lower among non-manual groups compared to manual working class groups, although the rates of smoking among both groups have been steadily falling since the late 1940s. In the UK the differential between class groupings in rates of smoking have been growing over time with steeper proportionate decreases in smoking among professionals, employers and managers than among unskilled manual employees in particular. Among the unskilled manual working class in the UK, there were relatively shallow falls in the proportion smoking up to 1984 and very little change since then. If we look at those in the lowest income quartile in the UK there have actually been increases in the proportion smoking among both men and women between 1976 and 1990 (Marsh and McKay, 1994, p. 24).

Given that the manual working class are the biggest grouping both in Britain and Ireland, this differential in smoking cessation or take-up is the most likely cause of the changing relationship between income and tobacco consumption.³ Though social class is a far wider concept than income taking in dimensions such as skills used in employment, and levels of responsibility and autonomy in work, the two are very well correlated with professional and managerial groupings having considerably higher average incomes than manual working class groups. Friel *et al.* (1999) show that rates of smoking among working classes 5 and 6 (skilled and unskilled manual) in Ireland are 48 per cent higher than among classes 1 and 2 (professional and managerial) among men and 36 per cent among women.

The question is, why has this differential widened and does this have implications for policies in relation to smoking? Trying to explain the differential in smoking between social class groups has been a major topic of literature in the UK (Fry and Pashardes, 1988; Marsh and McKay, 1994), but is missing completely from the literature in Ireland,⁴ even though expenditure on smoking is inversely related to level of income and a major draw on the

³ Conniffe (1994, p. 4.18) tested the hypothesis that within socio-economic groups income was positively related to consumption and found no relationship. The negative relationship between income and tobacco consumption is because higher income groups smoke less.

⁴ Though not to any great depth, this issue has been mentioned in several papers by O'Hagan (1997) and O'Neill and Sweetman (1999).

resources of low income households; this is a subject we will return to in the next chapter when we discuss the literature on the costs and benefits of smoking and the effects of tobacco taxation. It may be that the differential is explained purely by knowledge of the health effects of smoking; certainly evidence from a study in Ireland in the mid-1980s (O'Conner and Daly, 1985, p. 119) did suggest that regular smokers give significantly lower estimates of the risk of developing smoking related diseases than do non-smokers, although the vast majority of smokers and non-smokers were well aware of the risks. This could be because smokers would tend to be from lower income groups who also tend to have lower educational levels and thus are less likely to have read or understand warning literature. But given the high profile and multimedia nature of much health education this would seem unlikely as, in the extreme case, even someone unable to read would have seen television campaigns throughout the 1990s. If so, the lower estimate of risk may simply be cognitive dissonance (i.e. smokers justify a habit with lower perceived health risks and non-smokers vice versa) and we would have to look to other factors that are correlated with income and class that lead to higher rates of smoking, other factors moreover that would have important implications for effective health promotion.

Though advertising and exposure of smoking may contribute to maintaining or even increasing levels of smoking, it must be true to say that people tend to smoke because the perceived benefits of smoking outweigh the costs (setting addiction aside for a moment), even though the assessment of the latter may be difficult given the long-term risks involved. O'Conner and Daly's (1985) report found that 63 per cent of smokers found the habit "pleasurable", but most tellingly, around 80 per cent of men and 76 per cent of women found that smoking helped them relax and slightly less stated that it helped them overcome nervousness and embarrassment. Research (Whelan, Hannan, and Creighton, 1991; Whelan, 1994) has shown that lower income groups and those in income poverty are far more likely to experience psychological stress, mostly because their life circumstances lead them into experiencing chronic insecurity and little control over life. This may lead to an increased desire to smoke if smoking gives some relief from stress. This may be because of the psycho-chemical effects of nicotine (though evidence is not clear on this point), but could also be due to the more psychological benefit of taking time and space for a personal pleasure. Thus the high rates of smoking among this group may suggest that smoking acts as an aid to relieving stress, even though the people are well aware of the risks involved.

On the other hand, there is evidence that lower socio-economic groups are less future orientated and fatalistic, again as a response to their life circumstances over which they have little control, and this may lead to a discounting of health promotion information which appeals to future outcomes that may be years or even decades away.

If either of these hypotheses is true this has implications for health promotion which at present relies largely on identifying the negative consequences of smoking and the health benefits of quitting (Kelleher and Sixsmith, 2000), but does not try to specifically target those in lower socio-economic positions. A case could also be made that a policy which improved the standard of living of individuals in lower socio-economic groups may actually be more successful in helping people quit smoking, or decrease their consumption of tobacco. This area, which involves an interface between health promotion, social inclusion research and economics is under-researched and in need of attention, particularly in the light of the slowing decrease in the proportion of regular smokers in the population.

3.4 Summary and Conclusions

In this chapter we have reviewed the literature on the relationship between income and the consumption of tobacco. Standard economics would hold that if the cost of a commodity falls or incomes rise, consumers should either buy more or select a higher quality variety and this has implications for the extent of smoking, particularly during a period of rapid increases in incomes as we have seen over the last seven or eight years in the Republic of Ireland. Yet, if we examine the consumption of tobacco and the proportion of smokers in the population what we actually find is that both have been dropping, particularly since the late 1970s. Moreover, the relationship between income and tobacco consumption seems to have reversed with individual income level now being negatively related to smoking. Having reviewed the literature on the income/consumption relationship going back over the last forty years or so, this chapter sought to investigate what may have been happening to alter this relationship.

As in the last chapter on price elasticities, it is difficult to distil a coherent set of conclusions from the literature on income elasticities given the range of methodologies employed and assumptions made. The results differ widely in terms of the size and even direction of the effect, but what seems likely is that at some point after 1960, the income elasticity became negative, or fell to zero. Cross-sectional data, particularly the multiple year estimations used by Conniffe (1994) add evidence that the relationship did indeed turn negative and that higher incomes were associated with a lower propensity to smoke and a lower consumption of tobacco if a smoker.

This is an important development since it marks a change in the market for tobacco and that has been on a steady downward trend since the early 1960s. This change may have come about via the saturation of the market for tobacco and the move of tobacco to being an "inferior good", but it may also have been due to the impact of increasing health education campaigns, reports on the ill effects of smoking and the restrictions on advertising.

However, as this chapter also showed, there are clear class differentials in smoking that suggest that other factors may be at

play to limit smoking cessation among working class groups in particular. What UK and some Irish research would suggest is that there are structural socio-economic conditions such as income, deprivation and unemployment which give people an incentive to keep smoking as a way of relieving the stress produced by the situations they are in. If so, this has important implications for health promotion which has individual behavioural change as its aim at present, rather than a more far reaching agenda of changing the socio-economic conditions which breed the habit. The differential in smoking rates between socio-economic groups also has implications for taxation policy on tobacco since if the price/consumption elasticity among lower socio-economic groups is not higher than the population average discussed earlier in this report, increases in taxation on tobacco could be highly regressive since these groups spend a greater proportion of their income on tobacco.⁵ Research outside Ireland has suggested that elasticities among these groups are higher, but we have no Irish data to corroborate this. We return to this subject again in the next chapter when we examine the literature on the costs and benefits of tobacco, particularly in relation to taxation policy and then again in Chapter 7 when we will examine evidence from the Living in Ireland Panel Survey (1998) on the relationship of income and social class to smoking.

⁵ Though recent MRBI research for the Office of Tobacco Control (proceedings from the conference – Legislating for a Tobacco Free Society, Dublin Castle 31st October – 2nd November 2001) showed that 45 per cent of smokers would like to see an immediate doubling of the cost of a packet of cigarettes. Research by Gruber and Mullainathan (2002) has also shown that smokers may be “happier” after increases in cigarette taxes.

4. COST/BENEFIT ANALYSES OF TOBACCO USAGE

In the last two chapters we have examined the economics of tobacco from the viewpoint of the individual and the decision to smoke as it was affected by price, income and a range of other factors such as health education and socio-economic position. The implicit approach that we have taken so far has been to assess the costs and benefits to the individual of smoking, i.e. the extent to which the pleasure of smoking (and need to feed an addiction) is balanced by the direct costs of the tobacco, smoking restrictions and the indirect costs of long-term harm. From an economist's point of view, this cost/benefit analysis is all that concerns individual smokers. An individual smoker (in economic theory) does not worry about the cost of their smoking for others who have to share the same airspace, nor the aggregate implications of having a large number of people suffering from smoking-related illnesses and thus using the resources of an already stretched public health care system. These are social costs in the sense that they are concerns for public policy but do not necessarily affect the individual smoker. Here we examine the literature in the Irish context on the costs and benefits of smoking from a macro-economic perspective, particularly as they relate to the costs of smoking for productivity and health care services and benefits in terms of revenue from taxation of tobacco products.

Given the importance of the question of the costs and benefits of smoking to the Irish economy and state it is remarkable how little has been written and published on the subject in the Irish context. Nonetheless, we will review what is available and attempt to draw some conclusions from this as to the implications for policy. Luckily the major piece of work in this area is by Conniffe (1994) which, as we saw in the last two chapters is a rather comprehensive and high quality piece of work.

Although there is no doubt now that smoking has a negative effect on health, the argument as to whether tobacco consumption and the tobacco industry have a negative effect, in terms of the overall costs it places on Irish society, is a great deal more complicated. Cost benefit analysis attempts to identify all the costs and benefits associated with an activity, quantify them in a compatible manner and compare the total costs with the total benefits. What can legitimately be added into the equation and how these can be quantified are, however, difficult questions.

Differences in the types of costs and benefits added can have a huge impact on the balance of values and it is difficult not to be seen as "cooking the books" in the assumptions made about the elements included and the outcome envisaged (i.e. complete cessation compared to a 10 per cent reduction).

The benefits side of the equation is easier to estimate since it is made up of three items, the benefit to the exchequer of excise on tobacco sales, VAT on the expenditure on tobacco and the employment and income generated by the industry itself. The second of those benefits is, however, rather difficult to estimate since it assumes that the VAT harvested from expenditure on tobacco would not be gleaned from sales on some other commodity if it were not used to buy tobacco. On the other hand, the costs side is rather more difficult to estimate. One obvious area for inclusion are the health care costs of smoking in Ireland, but should we also attempt to put a monetary value on the suffering and pain caused to smokers themselves and their families? Similarly, should we also try to estimate the possible loss to productivity of days lost to smoking-related illnesses and the costs of "accidents" such as domestic fires caused by unattended cigarettes?

Conniffe (1994) argues and shows convincingly that a narrow approach of assessing the balance between health care costs and tax revenues plus employment creation is a more defensible option given the minefield associated with the inclusion of the contingent analysis of pain and suffering and the lost value of industrial output, but as we will describe below he shows that this approach does lead to particular conclusions that lean in the direction of an overall benefit. A review of these issues by Nelson (1986) on the other hand, took the wider approach and included costs to industry of lost productivity, the lost income of smokers as well as health care costs, but also excluded tax revenues from the benefit side. This, as one would expect, found the opposite of Conniffe (1994). In the next two sections we outline the way in which the costs and benefits of smoking have been assessed in the literature before coming to some overall conclusions.

4.1 The Costs of Smoking

The chief cost of smoking identified in the literature is of course health care given the established connection between tobacco use and a number of negative health outcomes. To attach a monetary cost to the value of treating the effects of smoking in the population we have to perform two basic operations: first we need to estimate the proportion of all hospital admissions and GP consultations that are due to smoking and then second, we need to attach some cost to these services. The first step required is by no means simple since, as Conniffe (1994, p. 6.1) argues, smoking is not a cause that is listed on death certificates or hospital inpatient records, but instead requires a complicated medical and actuarial judgement as to the extent to which a certain condition is caused by smoking. Only once this probability can be derived can

you then derive some proportion from the death and inpatient records and move onto the next step.

Conniffe (1994) used work from the UK by Johnson *et al.* (1991) and Godfrey *et al.* (1993) to calculate these proportions and moved to the second step, deriving the costs of health care costs and then applying these proportions to the total costs of health care services. The second step was complicated by the fact that the Irish health care system has a significant private component that is also subsidised by the State in the form of services and facilities and through tax relief on health insurance. Conniffe (1994) used evidence of the size of this private component from Tussing (1985) and Nolan (1991) to estimate that the cost of smoking to Irish public expenditure was between IR£34 million and IR£48 million in 1988.

Now it could be argued that this sum goes no way toward describing the true cost of smoking which is paid in the form of the suffering and distress of both smokers themselves, their relatives and, it is increasingly argued, passive smokers. However, calculating a value for this suffering is very difficult since it requires us to give it a monetary value. Conniffe (1994, p. 5.4) discusses the difficulty of doing this, even if we accept the use of health and life insurance as proxies of expenditures to cover the costs of the health outcomes. The main problem apart from the problem of separating subsidisation from the state is that insurance is generally held by those in upper income groups whereas smoking is increasingly the preserve of lower class groups.

One area that would increase the costs associated with smoking if included is that of lost productivity to industry. As with the estimates of the costs of smoking to health care this is contingent on being able to estimate the proportion of days lost to industry for which smoking is responsible, which as with health care estimates is not an easy task. Conniffe (1994) taking a critical stance using Hughes (1982; 1988), shows that absenteeism was increasing rapidly throughout the 1970s just as smoking was decreasing which does not suggest much of a relationship. He also argues, again using Hughes (1988), that economic variables, rather than lifestyle factors, seem to be the chief determinants of absenteeism. Because of this, Conniffe argues that using estimates of lost productivity is a highly dubious exercise since even using the lower average industrial wage, the value of such lost days (5.5 per cent of GDP at its peak in 1978) would dwarf expenditure on health.

4.2 The Benefits of Smoking

The primary benefit identified by Conniffe (1994, p. 6.7) is the excise raised by tobacco sales. This has fluctuated with consumption and levels of excise, but has basically increased since the mid-1980s, despite falling tobacco sales and amounted to almost 4 per cent of total receipts, or £312 million in 1988 (so that we can compare to the estimate of health care costs). This is a large amount of revenue, even though it does not include VAT and

has held up since the 1980s, mostly because increases in excise during the period in combination with low price elasticity on the part of smokers has offset the decreases in the overall number of regular smokers.

Tobacco may also have a benefit in terms of the employment that it generates both directly and through linked activities such as retailing (and thus also the income tax generated on this employment and the company profits to government). Conniffe (1994, p. 6.5) shows that the numbers employed in the tobacco industry fell by 46 per cent between 1975 and 1992 to around 1,300 jobs and argues that retailing and linked jobs probably accounted for around another 3,100 jobs in 1992, although he admits that his estimates are rather conservative. However, the fall in the numbers employed in the tobacco industry are not necessarily due to the fall in the demand for tobacco since there have been large changes in productivity in the industry due to technological change. Moreover, Conniffe (1994, p. 6.4) argues that an overall decrease in expenditure on tobacco may not necessarily lead to a decrease in employment if this expenditure is diverted into demand for other goods and services.

Finally, tobacco may also contribute to the national economy through the positive influence on the balance of payments made by tobacco exports. Conniffe (1994, p. 6.9) shows that in fact, in almost all the years between 1975 and 1992, the value of imports to the tobacco industry were greater than the value of exports showing that it had a negative effect on the balance of payments. In more recent periods the growth of other areas in the economy has decreased the importance of the tobacco industry and has lessened the impact of any trade deficit nationally.

4.3 The Overall Costs and Benefits

So far in this chapter we have examined the literature that seeks to balance the costs and benefits of tobacco and have tried to use this to identify the different components and give these some valuation. However, it has become rather clear that the decision about what is included in the calculus has a large bearing on the answer and the analyst has ample space to create their desired outcome if they chose the appropriate components.

It is clear that if we take a narrow "exchequer based" analysis of the costs and benefits of tobacco rather than the wider, though more tendentious approach of including pain, suffering and lost productivity then the outcome is in the favour of continued tobacco sales. Excise receipts from tobacco are far larger than the estimates of the costs of smoking to health care services and these are added to by the value of employment generated by the industry and the VAT receipts, though the latter two are of less importance. We could redress this balance easily if we counted in the costs to industry of lost production due to smoking related illness (as done by Nelson, 1986), but this component has manifold problems in valuation as discussed earlier in relation to the work of Conniffe (1994). Such a stark economic outcome does

not seem to do justice to the costs which most smokers themselves would admit the habit creates, but unless some way of including the distress and suffering which individuals and families experience could be found, this cannot be entered into the equation.

However, Conniffe (1994) contends that an argument about the present balance of costs and benefits should not really be our focus. Instead we should admit that evidence shows that smoking is injurious to health, take the elimination or reduction of smoking as the desired outcome and assess the economic consequences of this. A sensible option as used in Conniffe (1994) is to pursue the targets of the 1994 Health Strategy *Shaping a Healthier Future* and assess the impact of reducing the proportion of regular smokers to 20 per cent (the aim was to do this by the year 2000 but has not been attained according to current figures).

If we follow this scenario, the 30 per cent drop in the number of smokers would result in a fall in the revenues from excise to government, but the extent of the decrease would very much depend on the extent to which excise and tax increases are used to decrease smoking and prop up revenues. Chapters 2 and 3 of this review showed from the work of Conniffe (1995) that price elasticity among smokers in Ireland was around -0.28 in terms of consumption, but only -0.1 for complete cessation. Given this price elasticity, a fall of 30 per cent in the proportion of smokers would require an 80 per cent increase in the real price, which implies a tax increase of a higher magnitude (Conniffe 1994, p. 7.4). To keep revenue constant as the percentage of smokers fell would require greater levels of tax on the remaining customers and it may not be possible to stabilise revenues over the long run.

The lag in the effects of smoking impacting on health outcomes means that the narrow exchequer approach to the costs and benefits of smoking would lean in the direction of costs rather than benefits in the short run as revenues fell, but health costs remained almost constant. However, in the medium to long run the savings made on health care would balance and perhaps exceed the revenues from tobacco sales lost by increasing taxes and decreasing consumption.

Falls in expenditure on tobacco would, as discussed earlier, have implications for employment in the industry and thus income to government in the form of income tax. However, Conniffe (1994, p. 6.15) argues that the redirection of expenditure away from tobacco could actually increase employment in other sectors and actually increase net employment overall. He estimates that as many as 9,000 new jobs could be created in other areas, which net of the loss of 4,400 in tobacco would leave 4,600 more jobs. However this depends also on whether taxes on other commodities are increased to offset the fall in tobacco revenues since these would decrease employment elsewhere.

Both these outcomes would be good news for anti-smoking interests, but it is worth also emphasising that such increases in taxation and price could have other consequences that may not be

desirable. The sorts of increases in taxation that we have just hypothesised would be very regressive as the highest income group has the lowest expenditure on tobacco. This would mean that those groups that could least afford the increases in costs would spend a greater proportion of their income on tobacco, assuming that their consumption stayed the same. This point has been made by both Conniffe (1994) and O'Hagan (1997) and should be a serious consideration in policy discussions. The extent of the problem would depend upon the price elasticity of those on lower incomes. Some research outside of the Irish context has argued that poorer smokers have higher price elasticities (i.e. they would respond more to price increases) (Roemer, 1993; Townsend, 1987) and if true this may offset some of the effect, but there is no information in the Irish context with which to evaluate the question. Given the argument made in the last chapter about the possible reasons for smoking among this group however, it is probably sensible to be a little sceptical about price/consumption relationships among this group.

As well as the regressive nature of such taxes, increases of this magnitude would also make the level of taxation and price in Ireland far higher than in other EU countries and thus increase the incentive for smuggling. This could have a counter productive effect for anti-smoking policy since smuggled cigarettes may not carry the health warnings obligatory in Ireland. Although the full extent of tobacco smuggling is not known, it is clear that without border controls, large increases in price would make smuggling an attractive proposition if rates in other EU countries were not raised at the same time. Some evidence for this can be drawn from a study by Fitz Gerald *et al.* (1988) which examined cross-border shopping habits for alcoholic spirits between the Republic of Ireland and Northern Ireland. In the early 1980s, excise rates and exchange rates combined to make alcohol very much cheaper in Northern Ireland than in the South and the result was an apparent fall in sales in the South and a rise in exports. In fact these exports were either purchased legally by residents from the Republic on trips to the North or smuggled back, this flow accounting for almost one-quarter of all spirits consumed in the Republic.

4.4 Summary and Conclusions

Whereas in Chapters 2 and 3 of this review we have examined the economic literature that analyses an individual's decision to smoke and the effects of factors such as price, income and education, here we have looked to the literature on the overall costs and benefits to the country and economy as a whole. The first and most important point to make, as in other chapters, is that there is very little literature on this subject in the Irish context, although what little literature there is tends to be of a high quality. Conniffe's (1994) report for the Department of Health took both a broad and narrow view of both costs and benefits and found such analyses highly sensitive to the dimensions included in the analysis.

On the cost side it is clear that health care costs should be included and aside from various problems around the attribution of disease and the role of private health care it is possible to come up with a figure for the total costs of smoking. Similarly, on the benefits side of the equation, the revenues raised from excise on tobacco are a major source of funding for the government and are easily quantifiable using published statistics. If we add in some more complex, but essentially stable figures on employment created by the industry we can perform a narrow exchequer focused cost/benefit analysis which will lean heavily in the direction of the benefits of tobacco since revenues raised are far in excess of any possible health care costs. However, other researchers such as Nelson (1986) have argued that the cost of lost productivity to industry from the health effects of smoking should also be factored in since these could be substantial. This is true, but quantifying such effects is extremely difficult and inclusion does make the anti-smoking case look suspicious.

In the last part of the chapter we tried to place the cost/benefit analysis in a more useful context by hypothesising a one-third decrease in the prevalence of smoking and examining what effects this would have on the balance of costs and benefits. The first conclusion we drew was that to achieve such a reduction by price change alone would take increases in excise tax above 80 per cent given the relatively low level of price elasticity, but that if carried through, such a change would bring down the level of revenues to government severely. Such a scenario would in time make the economic case for tobacco less alluring, but could have serious implications for less well-off smokers who could not quit and for cross-border smuggling.

5. THE ADVERTISING AND MARKETING OF TOBACCO PRODUCTS

The central question in this area of literature is the extent to which smoking behaviour is influenced by advertising, or other forms of marketing such as sponsorship of high profile events, packaging and product placement. The international debate on this issue is highly contentious and is one in which both sides critique the scientific validity of each other's studies. Adjudicating between the opposing views on this topic is made more difficult by the fact that research in this area often emanates from agencies or individuals with particular views on the topic e.g. health organisations, anti-smoking agencies, free-market anti-regulation think-tanks, and tobacco manufacturers.

The extent of Irish literature on this topic is limited, therefore some reference will be made to the international literature in setting out the important themes. Publications on advertising and marketing tobacco in the UK are considered pertinent to this report because the same products are on sale in the Irish market and Irish consumers are likely to be exposed to the same advertising campaigns in British publications and watching British sporting events.

Before outlining the literature on the link between advertising/marketing on tobacco consumption, we briefly describe the current market for tobacco products in Ireland and the regulatory framework in which it exists.

5.1 The Irish Tobacco Market

As outlined in the introduction to this report, Irish consumers spent approximately €1,869 million on tobacco products in 2000. Expenditure on cigarette advertising in Ireland was estimated to be around €8.89 million in 1995 (*Management*, 1995). Given that increases in this expenditure are restricted to the level of inflation (but reduced overall by 5 per cent in 1998 and again in 1999), the current spend would amount to about €9.12 million.

Three companies dominate the Irish tobacco market: Gallaher Group, John Player and Son and P.J. Carroll & Co. The retail sector trade magazine *Checkout Ireland* (30/4/2000) reports the following market shares: Gallaher 50 per cent share; Players 30 per cent

share; Carroll's 25 per cent market share. However, this totals more than 100 per cent (105 per cent) and suggests that the figures should be treated with caution. It is reported that John Player is the most popular brand in Ireland (18 per cent market share), and Carroll's No. 1 is the fourth largest selling brand (8 per cent) (*Retail Magazine*, 30/11/99).

The cigarette market appears to be subdivided into a number of different sectors – low tar, extra long (100s, superkings etc.) and low price or “value” brands. These sectors are not necessarily mutually exclusive, for example there are low tar 100ml cigarettes on the market. Additionally, “roll-your-own” tobacco appears to be treated as a separate sector, which suggests that there is little crossover between these and ready-rolled cigarettes. The dominant companies in this sector are Gallagher, John Player and TDL (*Retail Magazine*, 1999).

5.2 Restrictions on Tobacco Advertising and Marketing in Ireland

Over the last three decades cumulative restrictions have been placed on the advertising and marketing of tobacco products in Ireland:

- Television advertising was ended by voluntary agreement in 1971.
- Radio advertising ended by voluntary agreement in 1976.
- Cinema advertising ended by voluntary agreement in 1978.
- Poster Advertising ended by legislation in 1980.
- Bus advertising ended by legislation in 1980.
- Shop front advertising ended by legislation in 1987.
- Press advertising ended by legislation in 2000.
- Corporate sponsorship ended by legislation in 2000.
- Greater restrictions placed on the display and marketing of tobacco-including the prohibition of use of words such as “low tar”, “light” and “mild” by the Public Health (Tobacco) Act 2001.

Since 1986 advertising spending by tobacco companies has been capped at the 1985 expenditure levels (with an adjustment for annual inflation). The 1991 Act⁶ additionally: capped sponsorship expenditure at 1990 levels; limited the advertising associated with sponsorship events; restricted the content of press advertisements; specified the health warnings to be included on cigarette packaging; required the inclusion of tar and nicotine contents on packages; and prohibited the use of coupons, gifts, price discounts and sales promotion on tobacco products.

⁶ Tobacco Products (Control of Advertising, Sponsorship and Sales Promotion) Regulations, 1991.

5.3 Advertising and Tobacco Consumption

The international literature on the relationship between advertising and tobacco use is divided and often polemic (e.g. High, 1999). One of the difficulties in measuring the impact of advertising on tobacco has been isolating the effect of advertising and sponsorship from other factors such as price changes, social attitudes, and health promotion. In many studies complete information is unavailable. Furthermore, establishing the role of advertising in the take-up of smoking is difficult since the decision-making process is multi-factorial and the linking mechanisms can be complex.

Tobacco manufacturers continue to claim that they are not trying to attract new smokers with their advertising and marketing campaigns. For example, the Tobacco Manufacturers Association website claims they advertise to reinforce brand values of existing customers, and to encourage existing smokers to switch brands or try new brands and not to increase overall consumption (www.the-tma.org.uk). They argue that one-third of smokers switch brands each year, and a 1 per cent increase in brand share would justify the industry's multi-million pound advertising spend. This claim about the extent of brand switching is repeated in other publications that oppose advertising restrictions (High, 1999) but the source of this information is not stated. Given the centrality of this argument for continuation of tobacco advertising there is very little attempt to quantify the extent of brand switching associated with advertising campaigns.

The view that advertising does not encourage additional consumption is contested by a considerable volume of research (see Jha and Chaloupka, 1999; Saffer and Chaloupka 1999; Smeets 1992 for international reviews).

The argument that advertising does not increase take-up and consumption is also at odds with the views of the advertisers that tobacco companies use to promote their product. In a review of documents obtained from the advertising agencies who had major contracts with the tobacco industry in the UK (Hastings and MacFadyen, 2000) advertisers refer to attracting new entrants and retaining potential quitters for example asking "is there a positioning that we can adopt that makes the brand more attractive to entrants?" (2000, p. 8).

There is remarkably little research into the role of tobacco advertising and tobacco consumption in Ireland, especially in light of the frequent policy interventions in this area. None of the econometric studies of tobacco consumption in Ireland include a term for advertising. O'Riordan (1969) notes that information on the volume of advertising is desirable but was unavailable, but concluded that his conclusions were not seriously impaired by this omission. Walsh (1975) does not include any advertising measure in his consumption model but due to the stability of the demand curve between 1961 and 1976, and despite the introduction of a ban on TV advertising in 1971, he concludes that "there is no evidence that the banning of television advertising in Ireland had a

significant effect on demand". Conniffe (1995) highlights the difficulty of measuring shocks to consumption such as the regulation of tobacco promotion, because of the number of such shocks and because Irish consumers view British TV and read British publications and so any such model would also have to take account of changes in the UK. He suggests that the downward trend in the proportion of the population smoking over time controlling for price effects suggests that State intervention in the tobacco market has had substantial effects. However, further empirical research which includes data on advertising expenditure (and on individuals' exposure to advertising) are necessary to establish the impact of advertising on tobacco consumption in Ireland, and to separate this effect from other changes e.g. in social attitudes and health education.

Ireland is, however, included in some of the studies that model consumption in countries with and without advertising bans. For example, Ireland is one of the 22 countries included in Saffer and Chaloupka's study.⁷ The study found that comprehensive advertising bans can reduce consumption but that limited bans have little or no effect, because advertisers will switch to non-banned mediums and because introducing new brands (and expanding markets through brand proliferation) is still possible.

5.4 Packaging

The packaging of cigarettes is seen by the industry as an important element of their marketing strategy and one that is likely to become even more important with the restriction of press advertisements. Advertising agencies have noted the potential of the cellophane wrapper:

Imperial has the machine technology to print high quality images in the cellophane wraps but to date the technology has been under-utilised. We want to look at making the current L and B [Lambert and Butler] campaign work using the pack outer as our advertisingit will become very important after the ad ban. (Quoted in Hastings and MacFayden, 2000, p. 11).

This technique has also been utilised in the Irish cigarette market. *Retail Magazine* (30/11/99) reports that P.J. Carrolls have been using "splat-packaging" to promote their cigarettes, which "allows for printing a design on the outer cellophane of the pack".

The colours used in packaging are also used as a means of promoting certain images about the product. For example white is used to signal the low tar category, the implication being that "the whiter the pack, the healthier they are". While gold and purple were seen to signify "quality and distinctiveness" (Hastings and MacFadyen, 2000, p. 35; see also Kaufman and Nichter, 2001).

Since 1972 tobacco manufacturers in Ireland have been obliged to place health warnings on the packaging. The front of the packet

⁷ Ireland is recorded as having four of seven possible bans in 1992.

must contain the warning "Smoking Seriously Damages Health". The back of the pack must use five of the following eight warnings in rotation (the first two are mandatory):

- Smoking causes cancer.
- Smoking causes heart disease.
- Smokers die younger.
- Smoking kills.
- Smoking when pregnant harms your baby.
- Stopping smoking reduces the risk of serious disease.
- Don't smoke if you want to stay healthy.
- Smoking causes fatal diseases.

The EU has passed a directive to increase the size of warnings on cigarette packaging, but there is little research on the effectiveness of such a measure. Jha and Chaloupka (1999) cite one Polish study, which reported that 3 per cent of male smokers said they quit as a result of the increased size of warnings. There is also some evidence that claims on packaging "low tar" and "low nicotine" cigarettes can lead to misconceptions about the healthiness of such products.

5.5 Ten Packs

The selling of cigarettes in a different size pack is another element of the marketing strategy. Ten packs are the preferred choice of young smokers and selling cigarettes in packs of ten has been identified by advertisers as an important way of attracting new entrant or experimenters (Hastings and MacFadyen, 2000). Proposals to prohibit the sales of ten packs in Ireland has been opposed by the Irish Retail Newsagents' Association. They argue that young people will simply club together to buy the larger pack, and that it will most adversely affect those on limited incomes. They further suggested that those who previously limited themselves to 10 cigarettes a day will be tempted to smoke more (reported in the *Irish Examiner*, 11/8/00).

5.6 Sponsorship

The World Health Organisation report (2000) on *Women and the Tobacco Epidemic* notes that tobacco industry sponsorship buys visibility, credibility, approval and may neutralise opposition. The most well-known and frequently documented case of tobacco sponsorship is the Marlboro association with Formula 1 Grand Prix, which has received an exemption from the EU ban until 2006. Until recently a number of major Irish sporting events have been sponsored by the tobacco industry, which reached large Irish audiences (*Irish Times*, 27/9/00). Tobacco sponsorship is now banned in Ireland, but sponsorship of major international events such as the Grand Prix are outside the jurisdiction of the Irish government, even though such events attract a significant Irish audience.

The broadcasting of such events has caused controversy between RTE and the Health Minister. The Minister suggested that emerging technology could blot out and replace the advertising

message, however RTE responded that this technology was only available to the host broadcaster and suggested countering the ads with anti-smoking advertisements during the commercial breaks (*Sunday Independent*, 2000). However, RTE has responded to complaints by ASH Ireland over the use and prominence of tobacco products/branding in RTE promotions in the run up to Formula 1 races, by banning the use of footage containing signs for tobacco products or brands (*Irish Independent*, 1/10/01).

To-date there has been no Irish research that tests the relationship between sponsorship and tobacco consumption, nor on the audience composition for these events in Ireland.

5.7 Young People and Advertising

There is a concern that young people are more susceptible to advertising because of greater social insecurity and image consciousness, particularly among teenage girls. Research among young Irish adults aged 15-30 years (O'Connor, Friel and Kelleher, 1997) found that fashion-conscious women were more likely to smoke, while fashion-conscious young men were less likely to smoke than other young men. The study does not investigate whether this link for young women is promoted by advertising or some other mechanism, although the authors note that "tobacco advertising is increasingly aimed at young women" (*ibid*, p. 138). Anecdotal evidence also suggests that many young women see smoking as a way of suppressing appetite and controlling weight gain.

Smoking also appeals to young people's desire to appear grown up. Tobacco advertising has been keen to capitalise on this appeal. For example, advertising agency documents from the mid-1970s advise "an attempt to reach young smokers, should...present the cigarette as one of the few initiations into the adult world." (ASH UK – PR in the Playground: Tobacco Industry Initiatives in youth smoking [www.ash.org.uk/advspo/playground.html]).

An important study in the US that reviewed twenty years of cigarette advertising found that when advertising of a brand increased, teen smoking of that brand was three times more likely than adult smoking to increase (Pollay *et al.*, 1996). Other studies in the US and UK have found an association between exposure to advertisements, recognition of cigarette products, owning promotional items and smoking experimentation and take-up among adolescents (see Kaufman and Nichter, 2001, p. 89; Smith and Stutts, 1999). However, the causality of this relationship has not been clearly established.

Studies of the factors that influence initiation of smoking suggest that advertising is not one of the most important factors. For example, an OPCS study does not include advertising among seven reasons why children begin smoking.⁸ While in the US

⁸ A fact that is stressed by the tobacco industry in defence of their advertising (TMA website).

research has found that advertising ranks low overall as a predictor of adolescent smoking (Smith and Stutts, 1999). However, both the studies highlight the strong influence of beliefs about smoking e.g. "having relatively less negative views about smoking" and "a belief that smoking is cool and indicates maturity." These perceptions could well be influenced by advertising and other promotion activities like sponsorship. One of the mechanisms through which it is argued that advertising works is by making smoking appear normal and socially acceptable and to associate it with positive attributes such as sophistication, success, glamour etc. (Amos, 1996).

5.8 Women and Tobacco Advertising

Reviews of tobacco marketing to women (Amos, 1996; Kaufman and Nichter, 2001) note that tobacco has been strongly promoted to women and that most common themes in these marketing campaigns are body image, fashion and independence. Furthermore, US tobacco manufacturers are noted to have sponsored events and organisations with strong female interest (e.g. women's tennis, fashion awards and sponsored women's organisations Kaufman and Nichter, 2001). British manufacturers/advertisers have highlighted the appeal of low tar cigarettes to women, while in Japan women are targeted with low-smoke cigarettes.

The international literature has highlighted the high level of cigarette marketing in women's magazines, and have found that those carrying such advertisements are less likely to have articles on the health risks of smoking. In a rare piece of Irish research on tobacco advertising in Ireland (Howell, 1994) examined the frequency of tobacco advertising in women's magazines and coverage of the adverse health effects of smoking. The study examined four Irish women's magazines over a five year period. He found that there were 684 tobacco advertisements as compared to 86 pieces about the negative effects of smoking, 15 of which were health promotion ads placed by the Health Promotion Unit, Department of Health. In terms of column inches, the amount of space devoted to pro-smoking messages was 14.5 times greater than the space devoted to anti-smoking messages. Howell also noted that none of the advertisements contained the warning "Smoking when pregnant harms your baby," a warning that would be highly relevant to the readership of these magazines. The omission of this warning is seen as a sign of complicity between the advertisers and the magazines.

5.9 Summary and Conclusions

The link between advertising/marketing and tobacco consumption is a contentious and complex one. International reviews suggest that advertising does have an impact, but the exact size of this effect is still under debate. The most striking finding is the lack of research from all sources including the tobacco industry

on this important issue in Ireland. Further investigation of this topic is needed to inform future policy decisions in this area.

There is evidence that young people have been widely exposed to tobacco advertising and that both for Ireland and the UK these campaigns pursue strategies to increase smoking amongst young people. Again the issue of how much advertising contributes to the decision to start smoking is a moot one. International literature has found an association between advertising recognition and smoking among young people but does not establish the direction of this causality. Some of the factors that have been found to predict smoking such as more positive perceptions about smoking may well be influenced in part by advertising, but there is little direct evidence of this. Further longitudinal research, which can measure exposure to tobacco marketing before take-up is necessary to develop knowledge on this issue.

6. THE ECONOMICS OF SMOKING AMONG CHILDREN

The issue of youth smoking has been argued to be an issue of particular interest for policy makers and economists on a number of grounds. First, it is argued that almost all the initial consumption of cigarettes occurs while an individual is a child or young adult. Second, at that age, it is contended that young people are either not well informed or do not consciously process information on the health hazards of smoking (Ross and Chaloupka, 2001). Third, it is asserted that young people are a particularly effective target group for smoking prevention programmes. This chapter reviews a range of economic literature on smoking among children and young people in Ireland. As well as establishing the prevalence of smoking among these groups, the discussion considers both the demand-side price sensitivity and the effects of supply-side smoking restrictions and health promotion campaigns on young people.

This chapter takes the following format. First, an attempt is made to establish the incidence and prevalence of smoking among children and young people in Ireland. These findings are then presented in the context of international studies and league table type analyses, in an attempt to establish Ireland's international standing in terms of the incidence of smoking among young people. Section 6.3 also briefly reviews studies examining variation in smoking according to gender, family socio-economic context and region. Finally, a brief analysis of the role of economic factors in smoking prevalence, particularly as they relate to the availability of part-time work, is presented in Section 6.4.

In Section 6.5 the issue of demand-side price-sensitivities is examined. The extent to which the price/consumption relationship is distinct for this age group is examined, including an analysis of the impact of prices on smoking initiation, smoking duration, smoking intensity/frequency and smoking cessation for children and young people.

Section 6.6 reviews supply side issues such as restrictions on smoking for children and young people as well as the role of health promotion and health awareness programmes, particularly those targeted at school children.

The final section summarises the main findings. While every attempt is made to draw on literature, research and studies emanating from this country, owing to a dearth of such literature the review also draws on international literature – particularly literature from the United Kingdom and the United States. Finally, this review is concerned primarily with smoking among school-age children (18 years and under). However, in some cases reference is made to the body of “youth” literature on this issue, which is variously defined as those aged under 18 years, those aged 21 years or under or even those aged 24 years or under.

6.1 Prevalence of Smoking Among Children and Young People in Ireland

A number of Irish studies examining the incidence of smoking among children have been conducted. Among the more recent are the Health Behaviour of School-Aged Children Survey (HBSC) and a survey conducted as part of the European Drug Dependence: Risk and Monitoring (DDRAM) project, both of which were conducted in the late 1990s.

Results from the HBSC survey – capturing school going children aged 9-17 years, across the eight Health Boards – are reported by Friel *et al.* (1999). In terms of smoking prevalence, they find that overall 49 per cent of the children report that they have ever smoked (51 per cent for boys and 48 per cent for girls) and 21 per cent report that they are current smokers. The rates of smoking increase with age. Commenting on these findings *Towards a Tobacco Free Society* contend that the very high levels of smoking reported prior to reaching 18 years would support the international experience that smoking behaviour is induced while smokers are still under age.

Brinkley *et al.* (1999), in the late 1990s examine the prevalence and patterns of use of legal and illegal substances among young adolescents, from research conducted as part of a European project Drug Dependence: Risk and Monitoring (DDRAM). The Irish sample includes just under one thousand second year students in 16 Dublin schools. They find that one-third of the sample had never smoked, while 16 per cent smoked daily. In addition, more girls than boys reported that they smoke daily. Pupils who reported that they smoked were asked to state what age they had started smoking. The average age at which pupils first smoked cigarettes was 10.8 years. Finally, pupils who smoked were asked to indicate how they usually obtained cigarettes. Of the pupils who smoked, 61 per cent said that they bought their cigarettes and 60 per cent said that they obtained them from a friend. Over 43 per cent said that the cigarettes were shared around a group of friends, 18 per cent said that they took them from home without their parents' permission. The majority of smokers said they smoked because they wanted to try (78 per cent), the next most common reasons were “because my friends smoke” (38 per cent) and “because it relaxes me” (23 per cent).

Perhaps most prominently, Grube and Morgan conducted studies in 1984 and 1991 (Grube and Morgan, 1986; Morgan and

Grube, 1994) examining smoking, as well as drinking and drug use, among Dublin school children. Crucially, over the period of their three-panel surveys they found evidence of a small but consistent decline over all age groups in the uptake of cigarette smoking. In addition, the numbers who indicated that they were smoking regularly had dropped somewhat over the period.

Over the period 1994 and 1991 they found a decrease in smoking prevalence among young people: measured in terms of both the percentage who had tried smoking and the percentage currently smoking. In terms of the proportion who had ever smoked, for example, the percentage of 16 year-olds had fallen from 73 per cent to 62 per cent, while among those 13 years and younger the incidence had fallen from 52 per cent to 46 per cent. In terms of current smoking, rates of non-smoking have risen by almost 10 per cent among each age group over the 1984-1991 period. Increases in the prominence of non-smokers are particularly noteworthy among the youngest age-groups studied (those aged 15, 14 and 13 years or less).

They conclude (1994) that the findings suggest that "smoking among young people may be losing favour". Studies in the late 1960s by O'Rourke *et al.* (1971) are cited to indicate that 68 per cent of young people had smoked at some time in their lives. Ten years later the figure was stable at nearly 70 per cent. In the 1984 survey (Grube and Morgan, 1986) the rate of prevalence of lifetime smoking was 67 per cent, again indicating that the rate had remained stable. The final study (1994) showed an overall youth lifetime smoking rate of just 61 per cent.

Finally, in 1993 a survey was conducted of 4,000 young people, almost all school attenders, commissioned by the Health Promotion Unit and conducted by the ESRI (1993). Unlike the Grube and Morgan studies that were confined to Dublin school children, this was a countrywide survey. The national study found a lower incidence of regular smoking than that reported in the more recent Dublin study (1994): over a quarter of those aged 16 and those aged 17 years and older were regular smokers. Such smoking prevalence was somewhat higher among males, accounting for almost 30 per cent aged 17 years and older, relative to just 23 per cent of females of the same age.

6.2 International Comparisons

Perhaps a short word of caution before examining international comparisons of smoking among young people. As Conniffe (Conniffe, 1994) warns, comparisons across countries in the incidence of smoking and the value of tobacco consumption are increasingly being made by international organisations. However, these comparisons should be interpreted with caution because they are not all fully compatible because of variations in survey dates, in definitions and in the methodology used to combine information on cigarettes, cigars and other forms of tobacco. With this caveat in mind, the following reviews three recent attempts to assess Ireland's position in an international context.

First, the findings of the Grube and Morgan (1990) report indicated that rates of smoking among Dublin school children were high in comparison with other countries. Among the entire sample, two-thirds had smoked at some point in their lives, and about one-quarter were regular smokers. In general, there was a tendency for girls to start smoking at a later age than boys. These levels of cigarette smoking were found to be particularly high in comparison with countries like the US, which has about two-thirds the rate of cigarette-smoking of the present sample.

The Health of Our Children report (2000a) presents results of the HBSC survey for a wide range of countries. In terms of the incidence of smoking they find that Ireland occupies a somewhat intermediate position in a European context. However, when comparisons further afield are made, levels of smoking are found to be somewhat higher in Ireland. To illustrate, in terms of the proportion of boys aged 15 years who report daily smoking, the figure for Ireland is 19 per cent relative to just 13 per cent in the US.

Finally, and most recently there has been a move to large-scale surveys which compare data gathered in a similar way in different countries, thereby overcoming some of the potential problems of international comparisons as mentioned above. The European School Survey Project on Alcohol and other Drugs (ESPAD) (Hibell *et al.*, 1997) is one such study. Surveys were conducted in twenty-six countries, including Ireland, where a national sample of 1,849 fifth year pupils participated in the survey. Overall, 74 per cent of pupils had tried cigarettes at least once, while 37 per cent were regular smokers. Importantly, both figures are higher than the average proportion for all countries.

6.3 Gender, Socio- Economic Status and Regional Variation

A number of studies have examined variations in the incidence of youth smoking by gender, socio-economic background and region. Grube and Morgan (1990), Morgan and Grube (1994) find that neither fathers' socio-economic status or mothers' employment are related to smoking. However, they do find significant findings in terms of peer influence – the perceived use of cigarettes by a best friend was strongly associated with cigarette smoking.

Interestingly, the HBSC survey found significant gender variation. Although boys are found to start smoking at an earlier age, by age 15-17 the smoking rates for girls exceed those for boys (Friel, Nic Gabhainn and Kelleher, 1999). In addition, among girls they find a social class effect, with 15-17 year olds from social classes 5 and 6 reporting current smoking rates of 40 per cent compared to 33 per cent of those from social classes 3 and 4. In general, the data would seem to suggest that children of lower income groups experiment later with tobacco than middle-income groups. Older children from higher income families are more likely to smoke than children from middle-income families.

Finally, the 1993 Health Promotion Unit Survey suggests some regional variation in smoking incidence among those aged 13 to 17

years. Although partly reflecting differences in the age distribution between regions, the results suggest higher smoking prevalence among young people from the East and West, and somewhat lower incidence in Midland and North-Western regions. While these differences may relate to economic, cultural or educational variations, there was no attempt to explore possible reasons for these regional differences.

6.4 Economic Climate and Part-Time Employment

The relationship between cigarette consumption among children and young people and income/employment opportunities is also an issue of relevance. Recent figures for Ireland suggest that half of all second-level students in Ireland engage in part-time paid employment (McCoy and Smyth, 2002). There is also recent research to support the importance of such income in allowing cigarette purchase and smoking participation. Morgan (2000) found that over 30 per cent of second-level students in a Dublin survey reported spending some of their earnings from part-time work on cigarettes, with two-thirds of these spending quite a lot, or a lot of their money on the purchase of cigarettes. Interestingly, such expenditure on cigarettes accounted for a higher proportion of spending among students in disadvantaged schools.

This role of part-time paid employment in supporting smoking has a number of important implications. First, the availability of part-time employment is highly responsive to wider economic climate or cyclical effects (McCoy and Smyth, 2002). Does this mean that during periods of economic slowdown when the availability of student part-time jobs declines, young people are less likely to engage in smoking or at least consume at lower levels? Or does the reduction in income lead to trade-offs in other consumption patterns? These questions have yet to be addressed by research in Ireland.

6.5 Price Responsiveness Among Children and Young People

As Conniffe (1994) observes, there is a substantial existing Irish literature on the effects of price and other factors on smoking. Much of this Irish literature has been concerned with estimating price and other elasticities. However, the picture with regard to studies of children and young people is less clear with few studies examining the price/consumption relationship for smoking among children.

One of the few Irish studies to consider variations in price elasticities for different age groups was that undertaken by Conniffe (1994). He came to two important conclusions. First, he found evidence of higher price elasticities among young people. However, for all age groups, he found that the quantities smoked by committed smokers would not decrease greatly given a price increase. He argued that these results would imply a different type of addictive model for young people: "Before young people become committed smokers there would be a stage where the price of cigarettes would matter considerably to whether people

become confirmed smokers or not. The affordability of other desirable commodities may depend on what is spent on smoking and the addictive dependency may not have built up to a level where the smoker is effectively unable to stop" (p. 2.12). This might explain greater price responsiveness among young people, which diminishes as people become more committed smokers with age.

To further explore this issue studies conducted in the UK and US will be considered. Jha and Chaloupka (1999) found strong evidence to suggest that children are more responsive to price rises than older adults. They argue that this is because young people have lower disposable incomes, but also because some may, as yet, be less heavily addicted to nicotine. Children are more susceptible to peer influences thus, if one young person stops smoking because he or she can no longer afford to do it, friends are more likely to follow suit than amongst older people. Researchers conclude that when prices are high, not only are existing young smokers more likely to quit, but that fewer potential young smokers will take up the habit.

Similarly, Lewit and Coate (1982) studied teenage smoking in the US and concluded that "teenage price elasticities of demand are large. The smoking participation (prevalence) elasticity equals -1.2 and the (total) quantity smoked elasticity -1.4".

Townsend *et al.* (1994) studied the effects of price, income and health publicity on cigarette smoking by age, sex and socio-economic group in the UK. Women of all ages, including teenagers, appear to be less responsive to health publicity than men, but more responsive to price. Overall, significant price elasticities were found among young women (-.86 for 16-19 year olds and -0.96 for 20-24 year olds) but insignificant price elasticities were found for young men. They argue that young people have relatively low incomes with a high proportion of it available for discretionary expenditure, so that changes in income are more likely to affect their smoking patterns. The findings of this study support this assertion for young females.

One of the possible reasons for conflicting findings regarding adolescent cigarette demand may relate to the precise aspect of cigarette usage that is being examined: smoking onset, smoking frequency or smoking cessation. As Tauras *et al.* (2001) observe, cross-sectional analyses of cigarette demand have generally found that cigarette prices and the probability of youth smoking are inversely related. However, studies that have modelled the determinants of youth smoking *initiation* have concluded that price is an insignificant determinant of smoking onset.

They draw on the Forster and Jones (1999) study, which employs data taken from the *British Health and Lifestyle Survey* to investigate individuals' decisions to start and quit smoking. They found cigarette excise taxes to be insignificant determinants of smoking initiation. However, they concluded that increases in excise taxes would shorten the amount of time an individual smoked and thereby increase the likelihood of smoking cessation.

Similarly, DeCicca *et al.* (1999) used panel data from the *National Education Longitudinal Survey of 1998* to model youth smoking initiation decisions. They employed both a smoking onset function as well as a discrete time duration model in their investigation. They concluded that both cigarette prices and excise taxes are insignificant determinants of smoking onset between 8th and 12th grade.

The study by Tauras *et al.* (2001) found that a 10 per cent increase in the price of cigarettes would decrease the probability of smoking initiation between 3 and 10 per cent, depending on how initiation is defined. In addition, individuals who are classified as having initiated smoking based on greater cigarettes smoked are more price responsive than are individuals classified as having initiated smoking based on fewer cigarettes smoked. This is not surprising given that many adolescents who experiment with cigarettes or smoke in small quantities never purchase their own cigarettes, but rather "borrow" from a friend.

One of the few studies to examine the impact of price on young smokers who consume at different levels was the study by Liang and Chaloupka (2001), a US study based on 1992 and 1994 data. They test the effects of price rises for different groups of young smokers (high school seniors) – classified according to the intensity of their smoking. Higher prices were associated with lower smoking in all cases. The effects of higher prices, however, are largest at the heaviest smoking levels. Overall, they find that higher cigarette prices are effective in discouraging youth from reaching a higher level of cigarette intensity.

Finally, Ross and Chaloupka (2001) test the effects of various price measures on youth demand for cigarettes using data collected in a nationally representative survey of 17,287 high school students (US). In addition to commonly used cigarette price measures, the study also examined the effect of price as perceived by the students. They found that higher cigarette prices would result in substantial reductions in both smoking participation and average cigarette consumption among high school students. Again young people are found to be more price responsive than adults in their demand for cigarettes. However, if perceived prices more accurately reflect the prices young people pay for their cigarettes, the price elasticity is even higher.

One possible reason for greater price sensitivity among young people may relate to their motivations for smoking. Rugkasa *et al.* (2001) conducted a study in Northern Ireland aimed at gaining a better understanding of the meaning smoking and tobacco addiction held for young people. He conducted 85 focused interviews with adolescent children from economically deprived areas of Northern Ireland. He found that children seem to differentiate conceptually between child smoking and adult smoking. Whereas adults smoke to cope with life and are thus perceived by children as lacking control over their consumption, child smoking is motivated by attempts to achieve the status of cool and hard, and to gain group membership. Adults have

personal reasons for smoking, while child smoking is profoundly social. Adults are perceived as dependent on nicotine, and addiction is at the core of the children's understanding of adult smoking. Child smoking, on the other hand, is seen as oriented around social relations so that addiction is less relevant. These ideas and perceptions leave young people vulnerable to nicotine addiction.

In summary, the single most consistent conclusion from the economic literature on the demand for cigarettes is that consumers react to price changes according to general economic principles – an increase in price leads to a decrease in consumption. While estimates vary from study to study, the current consensus is that children and young people are more responsive to cigarette prices than adults. Overall, there is considerable evidence from other countries that price affects consumption particularly for young people. However, it is difficult to generalise these findings to the Irish situation. More research is needed to evaluate the potential effects of price changes on the initiation, prevalence and cessation of smoking among young people.

6.6 Health Promotion and Awareness Programmes; Smoking Restrictions for Young People

Two main issues are addressed in this final section. First what is the role of anti-smoking health promotion strategies in Ireland, particularly those targeted at school-children? Second, to what extent do restrictions on the supply of cigarettes impact on cigarette consumption among this age group?

Two main health promotion initiatives are currently operating in Irish schools (Towards a Tobacco Free Society). The first, *The Smoking Reduction Action Programme* (SCRAP) is a peer-led anti-smoking programme for schools. The programme was developed by the Department of Health and Children in conjunction with the Irish Cancer Society, the National Youth Federation with support from the Department of Education. The second programme is *The Smoke Busters Project* which is aimed at primary school children (7-11 years) in an urban environment. This project was developed by the Irish Cancer Society, the Departments of Health and Children and Education and the Eastern Health Board. The exact contribution such programmes are making to the raising of awareness about the health and other dangers of smoking has yet to be assessed.

A wide range of public policy measures have also been introduced to restrict young people's access to cigarettes in Ireland. These include age restrictions on the purchase of cigarettes, advertising bans and restrictions on smoking in public places. These restrictions have all been introduced with the aim of curbing the smoking access of children and young people. For example, as *Towards a Tobacco Free Society* (2000b) contends, the influence older teens have on younger persons' lifestyle choices is significant. If secondary school pupils are legally permitted to buy cigarettes, this ensures that smoking is validated as a lifestyle

choice for the late teens and, therefore, is a highly desirable lifestyle for younger teens.

Little systematic attempt, however, has been made to assess the impact of such smoking/cigarette restrictions on children in Ireland. Research from other countries, however, does throw some light on the issue. Wakefield *et al.* (2000) find some support for the role of restrictions on smoking in public places in reducing teenage smoking. They find that restrictions on smoking at home, public places and school were associated with a greater likelihood of being in an earlier stage of smoking uptake and were associated with a lower 30-day prevalence. Similarly, Ross and Chaloupka (2001) also find that the effects of public policy restrictions on youth smoking are significant in reducing smoking. While Tauras *et al.* (2001) conclude that estimates suggest that minimum purchase age laws, restrictions on smoking in public schools and restrictions on the distribution of free tobacco samples could be effective tools in decreasing smoking initiation.

Conversely (Jha and Chaloupka, 2000) argue that reducing the supply of tobacco is not effective in reducing tobacco consumption. Attempts to impose restrictions on the sale of cigarettes to youths in high-income countries have mainly been unsuccessful. They contend that young people seem to underestimate the risk of addiction. Among US students in their final year at high school, fewer than two out of five smokers who believe that they will quit within five years actually do so (US Department of Health and Human Services). Recent economic modelling suggests that even if young people "decide" to risk becoming addicted, imperfect information can result in seemingly rational decisions being viewed later with regret (Orphanides and Zervos, 1995).

However, given the lack of analysis of the impact of these measures to restrict the access of children and young people to cigarettes in Ireland, it is not possible to say whether, or to what extent findings from other studies are generalisable to the Irish context. Chapter 7 explores the issue of the effect of marketing and advertising on smoking in greater depth.

6.7 Summary and Conclusions

This chapter has addressed a number of areas in relation to smoking among children and young people in Ireland. Among the questions which have been posed are:

- What is the prevalence of smoking among children and how has this changed over time?
- To what extent does the incidence of smoking among children vary by gender, socio-economic status and regional characteristics?
- To what extent is the price/consumption relationship different for children and young people, as distinct from adults?
- Is the fall in youth smoking over time due to price increases or health awareness/promotion strategies or restrictions on smoking, particularly for children and young people?

Various sources suggest a lifetime smoking rate among Irish teenagers of 50 to 65 per cent, and a current smoking rate of between one-fifth and one-third, with rates increasing with age. There is evidence to suggest a decline in smoking incidence among Irish young people over recent decades. Variations in smoking rates are apparent by gender, socio-economic background and regional criteria. Overall, smoking prevalence among Irish children is broadly in line with other European countries, but is somewhat higher than countries like the United States.

Overall the literature appears to support a general conclusion that young people are more responsive to cigarette price rises than adults. Irish research on the subject suggests that such age variation in price sensitivity may relate to the greater likelihood that young smokers are less committed smokers having more recently taken up the habit. However, international research suggests that price may not be a significant determinant of smoking initiation. Overall, it is not clear whether the effects of cigarette prices vary according to the aspect of smoking being examined: smoking initiation, smoking frequency and smoking duration/cessation.

Programmes have recently been introduced in Irish primary and second-level schools with the aim of raising awareness of the health dangers of smoking. However, there has been little systematic effort to assess the effectiveness of such programmes. Likewise, restrictions on the access of children and teenagers to cigarettes and cigarette advertising have been introduced but it is unclear how effective such restrictions have been and whether they have actually contributed to the decline in smoking incidence among such young people.

7. EVIDENCE FROM THE 1998 LIVING IN IRELAND SURVEY

Each year since 1994, The Economic and Social Research Institute (ESRI) has been carrying out the Living in Ireland Panel Survey (LIS), a representative survey of Irish households and individuals that forms the Irish component of the European Community Household Panel Survey (ECHP). Interviewers from the ESRI return to the same households and attempt to interview individuals about a range of subjects, but with an emphasis on getting high quality information on the income and material living standards. In 1998 however, Eurostat, the funding agency of the ECHP, included a number of questions on smoking behaviour that we will use in this chapter to examine some of the issues that have been discussed in this review so far. In the first part of the chapter we examine some of the characteristics of the LIS data and how this has developed since 1994 before turning to a descriptive analysis of smoking in Ireland. We will present statistics on the age and sex breakdown of smoking, but also examine some interesting data about the differentials in smoking between social class and income groups.⁹ This is an important issue that the LIS data are particularly suited to given their emphasis on the income and deprivation circumstances of the household. In the final part of the chapter we adopt more multivariate statistical methods to examine the factors associated with regular smoking and how income and cigarette consumption are related. More detailed information on the Living In Ireland Panel Survey can be found in the Appendix to this report.

⁹ Here we concentrate on cigarette rather than cigar or pipe smoking since to include the latter two would obscure the main analysis, but would not substantially alter the results.

7.1 A Descriptive Analysis of Smoking Patterns

In this section we begin the analysis of the data in the LIS Survey by examining the prevalence of smoking among different groups at interview using descriptive statistics. Table 1 shows the present and past smoking behaviour of the sample in 1998, a useful statistic that is not often reported. The Eurostat question asked respondents "do you smoke daily, occasionally or never?", and if they chose never, whether they had smoked daily, occasionally or never in the past.

Table 1: Present and Past Smoking by Sex

	Proportion Smoking Daily		
	Male	Female	All
Daily	27.3	24.6	25.9
Occasionally	4.8	4.3	4.6
Daily in Past	16.2	10.8	13.4
Occasionally in Past	3.9	3.9	3.9
Never	47.8	56.4	52.2
Total	100	100	100
N	3,099	3,220	6,319

Table 1 shows that 30.5 per cent of the sample smoked regularly or occasionally at the time of survey and 26 per cent on a daily basis, almost identical figures to those found in the Slán, National Health and Lifestyle Surveys carried out in the same year. Altogether almost 48 per cent of respondents either smoked currently, or had smoked either regularly or occasionally in the past.

There are however significant differences between groups in smoking behaviour. Table 1 shows that significantly fewer women than men currently smoke regularly ($P=0.017$), although more men were daily smokers in the past, which could suggest higher rates of cessation among men, but is more likely to relate to the higher rates of smoking among men than women in the past. If we add in differences in smoking rates by age as well as sex in Table 2, this shows a more complex picture than is suggested by the lower rate of current female smoking in Table 1.

Table 2: Proportion Smoking Daily by Sex and Age Group

Age Groups	Proportion Smoking Daily	
	Male	Female
<25	18.6	26.0
25-34	30.0	30.4
35-44	35.6	28.4
45-54	28.4	22.4
55-64	24.1	22.9
65+	25.1	15.6
All Age Groups	27.3	24.6
N	3,099	3,220

More men than women smoke in all age groups except for among those under 25 where the rate among women is over 7 per cent higher. This pattern has been found in the UK and suggests a

worrying trend among young women, although it should be said that older female age groups have higher rates.

Table 3 shows that this higher rate of daily smoking among men is also accompanied by a higher number of cigarettes smoked, with men smoking more than women even in the under 25 age group, although, as the last column of Table 3 shows, this difference is not significant.

Table 3: Mean Number of Cigarettes a Day by Sex and Age Group

Age Groups	Mean Cigarettes Per Day (Std in Parentheses)		
	Male	Female	Sig. (P)
<25	14.31 (7.49)	13.91 (5.88)	0.613
25-34	18.07 (6.87)	16.18 (7.20)	0.015
35-44	21.35 (15.11)	19.19 (9.68)	0.134
45-54	24.84 (15.13)	18.92 (9.65)	0.002
55-64	24.36 (16.07)	18.02 (11.25)	0.028
65+	23.19 (15.06)	15.02 (9.76)	<0.001
All Age Groups	21.27 (13.72)	16.95 (9.09)	<0.001
N	3,099	3,220	

The figures in brackets (the standard deviations) show that there is also more variation among men, which could suggest that men's level of consumption is more varied than women's with possible implications for cessation.

One of the main issues of the literature in Chapter 3 of this review was the relationship between income and smoking that had changed considerably over the last forty years. Whereas historically, the quantity of tobacco smoked was positively related to a person's income, as is the case with most commodities, in more recent periods, evidence suggests that the relationship became neutral, or that having more income led both to a higher probability that the person would not smoke, or that if they did, that they would smoke less. The LIS data gives us the opportunity to examine this question as we have very detailed information on the income level of the individual and their household, plus data on their past and present occupational status that allows us to investigate the relationship between social class and smoking. It is important to emphasize here that the processes underpinning the income/smoking relationship could be different from those associated with social class, although the two are highly correlated. A person's income level dictates their level of consumption directly (although this can be augmented with savings etc., if current income is lower than a person's long-run income), whereas social class may influence consumption via other factors, some cultural (i.e. some social classes may have a "smoking culture"), or linked more indirectly, say through the influence of smoking as a coping behaviour in situations of insecurity. Here, using the LIS data we use income, socio-economic and social class measures when examining the distribution of smoking.

Table 4: Proportion Smoking Daily by Income Quintile and Sex

Income Quintiles	Proportion Smoking Daily	
	Male	Female
Lowest	34.1	31.5
2	29.9	23.3
3	26.1	25.3
4	24.2	18.4
Highest	23.3	23.4

Table 4 shows the proportions from different household income quintiles who smoke daily. The income quintiles are constructed by measuring each household's weekly disposable income (that is income after the payment of tax and PRSI, but before any expenditure) and then dividing this figure by an "equivalence scale" and dividing the resulting values into five equal groups. The equivalence scale is a number designed to make households of different compositions in terms of the number of adults and children, comparable. Here we use an equivalence scale which gives the first adult a value of 1, each subsequent adult the value .66 and each child the value .33 (e.g. a household of two adults and one child would have the value 1.99). These values approximate the values implicit in the Irish social welfare benefit system.

Table 4 shows that among men and women, the higher the income quintile, the lower the proportion who smoke daily, although in the case of women this pattern is not as distinct. Among men, the proportions smoking in the lowest income group are 46 per cent higher than among those in the top income group. This pattern strongly supports the findings discussed earlier in this review, but could it be that among those that smoke, higher income leads to higher levels of smoking? As a simple test of this we used a partial correlation between income and the number of cigarettes consumed daily, controlling for whether the person smokes at all and found that there is no significant correlation between income and smoking. This test is, however, rather crude since it does not control for other factors, particularly age and sex that may confound the analysis, especially given the different age/sex patterns in smoking that we have already observed in this chapter. To get round this problem we will model both the proportion who smoke and the amount of cigarettes smoked in the final section of this chapter.

It is clear that there is a negative relationship between income and the prevalence of smoking, if not the amount of tobacco smoked, but this leaves open the question of why this inverse relationship now exists. Walsh (1980) saw this as a market saturation issue in the 1950s and that tobacco had now become an "inferior" good which could neither increase the level of consumption (which he saw as already high internationally) or the quality/price of the product. This is really just another way of saying that preferences changed and the subsequent decline in smoking rates may suggest that preferences changed because

consumers were taking notice of the reported health effects of smoking. If so, the inverse income relationship that we see may actually be due to other factors that happen to be correlated with income. As mentioned earlier, these could include different cultural stances toward tobacco maintained by differential exposure to anti-smoking literature and tobacco advertising. A good example is the sponsorship of snooker and formula one which have a more working class than middle class audience. A more complicated and indirect route may be differences in stress brought about by economic insecurity discussed in Chapter 3. Such factors can all be summed up to a certain degree by a social class measure such as that used by the Central Statistics Office (CSO). This is based on an amalgam of educational level, occupational skills and control of resources summed up in an occupational title and employment status and we show the prevalence of smoking among such groups in Table 5.

Table 5 shows that the rate of smoking daily increases as we move down the columns toward less skilled and resourced groups. However, the relationship is not altogether straight forward as the unskilled manual group among both men and women have rates of smoking lower than among farmers and semi-skilled manual worker group. The value for the unskilled manual group appears to result from the predominance of more traditional, mostly male jobs in this class that means that it is mostly populated by older men who have a lower smoking rate.

Table 5: Proportion Smoking Daily by Social Class (CSO) and Sex

CSO Class Groupings	Proportion Smoking Daily	
	Male	Female
Higher Prof/Managers; Proprietors & Farmers 200+ Acres	18.9	8.9
Lower Prof/Managers; Proprietors & Farmers 100-199+ Acres	22.4	15.7
Other Non-Manual; Farmers 50-99 Acres	27.1	26.1
Skilled Manual; Farmers 30-49 Acres	30.1	30.2
Semi-Skilled Manual; Farmers <30 Acres	39.0	33.4
Unskilled Manual	26.5	17.5
All Classes	27.0	23.2
N	2,960	2,942

NB: Social class for men and women is that of the household and defined by the "dominance procedure" of the highest class position in the household taking into account number of hours worked.

Nonetheless, discounting this, the relationship is fairly plain with the highest grouping having a rate of smoking 51 per cent lower than the semi-skilled grouping among men and 73 per cent lower among women. These are very large differences in smoking behaviour, far greater than the differences between the income quintiles we examined earlier on and larger even than the proportions smoking daily if we divided the income distribution into deciles. Such results could then suggest that factors other than the basic income differences between social class groups underpin the differences in smoking rates.

7.2 Modelling Smoking Prevalence and Cigarette Consumption

The last section showed that there is some relationship between income and social class, but it is entirely possible that these bivariate relationships could be misleading because of the confounding effects of other factors such as age and sex. Moreover, we also have other hypotheses about the factors that explain the probability of smoking that are also worth examining and this is best achieved using a multivariate framework.

As we saw in Chapter 3 of this review, others, most notably Conniffe (1994, 1995), have modelled the relationship between various factors and tobacco consumption using individual level data and it is worth applying some of the lessons from that analysis here. One of the most important aspects of Conniffe's work was that he used a two-step modelling procedure where the probability of being a smoker was modelled in a separate equation from the consumption model. This is important since the factors that are associated with the probability of smoking are not necessarily those that influence the level of consumption. Though Conniffe did not take this approach, it could be argued that the two equations should be estimated simultaneously so that the level of consumption is not independent of the probability of smoking (using, for example, the Heckman selection model). This approach has its merits, but we would argue that we are not attempting to estimate the level of consumption of the population as a whole (the central assumption of selection models), just those that smoke and thus we do not adopt this approach.

Taking first the probability of smoking, we have seen that income and social class are both related to a higher probability of smoking, yet we also felt that other factors may have an influence. One area discussed was the effect of education which can be seen both as the formal education received in school or university and the more informal routes of health education, advertising and marketing. Unfortunately, we have no available measures of the latter two routes, but can use the respondent's formal educational level as a proxy for their ability to absorb health messages and amass health promotion information. We also discussed the effect that psychological stress may have on the probability of smoking – although evidence is not clear as to the exact mechanism involved, it does seem that the two are linked and evidence from the UK (Marsh and McKay, 1994) has shown as much. Luckily the LIS survey contains the 12-item version of the General Health Questionnaire (GHQ12) that is a measure of psychological stress. Here we use this to examine whether stress contributes to the probability of smoking after we have controlled for other factors such as income, social class and education (as well as sex and age).

As our dependent variable is the probability of smoking daily we use a logit model to estimate the log probability as a function of a set of predictor variables including log equivalent household disposable income, CSO social class grouping, highest educational

qualification and GHQ12 score. The results for this model are shown in Table 6.

Table 6: LOGIT Model of the Probability of Smoking Daily

Variable	Estimate	Significance
Age	-0.01	***
Female	-0.20	**
Log Equivalised Income	-0.03	<i>n.s.</i>
CSO Class 2	0.44	**
CSO Class 3	0.71	***
CSO Class 4	0.82	***
CSO Class 5	0.95	***
CSO Class 6	0.38	<i>n.s.</i>
Primary Education Only	0.75	***
Junior Certificate	0.33	*
Leaving Certificate	0.03	<i>n.s.</i>
GHQ12 score	0.05	***
Constant	-1.23	**

N: 4,981 Cox and Snell: 0.0382 LL: -2671.7909

Significance Key: * : <0.05 ** : <0.01 *** : <0.001

Working down the list of variables in Table 6 we can see that age tends to have a negative effect on the probability of smoking (a quadratic term was tested but was non-significant), as does being female compared to being male (the "reference" category). Both these results simply confirm the findings of the earlier descriptive analyses, except here we can control for other factors. More interestingly we can see that though income has a negative relationship with being a daily smoker (as we would expect from our earlier analyses), the effect is not statistically significant suggesting that other factors, correlated with income may actually have more importance. One of these would seem to be social class which as Table 6 shows is a very significant positive predictor for regular smoking for all classes when compared to the higher professional, large farm and proprietor class. The exception here seems to be the lowest unskilled manual class which we saw before was problematic for the measure. If we move onto the education variables, those with primary education only or a Junior Certificate are more likely to smoke daily when compared to those with a third level qualification. Those with a Leaving Certificate are no more likely to smoke. Finally in Table 6 we can see that the GHQ12 score is positively related to smoking, thus those with higher levels of stress are significantly more likely to smoke.

Having estimated a model of the probability of smoking we can now turn to the second equation, that of the level of cigarette consumption. The LIS survey asked those respondents who smoked daily how many cigarettes they smoked on average and we use this information to estimate a model of consumption. However, unlike in the last model, here we simply want to look at the relationship between income and number of cigarettes smoked controlling for age and sex. To do this we use a standard OLS equation and enter the three variables, age, being female and log equivalent income as predictors. The results for this equation are shown in Table 7.

Table 7: OLS Model of Number of Cigarettes Smoked Daily

Variable	Estimate	Significance
Age	0.06	***
Female	-3.05	***
Log Equivalent Income	-0.15	<i>n.s</i>

N: 2,423 R²: 0.0249

Significance Key: *: <0.05 **: <0.01 ***: <0.001

Table 7 shows that, though age may be negatively related to the probability of smoking, among regular smokers, older respondents smoked significantly more cigarettes. Being female on the other hand had a significant negative effect compared to being male. However, our main interest is in the effect of the income variable; Table 7 shows that though negative as predicted, the effect is actually not significant. This supports the finding of the descriptive analyses and confirms that more income does not lead to increasing consumption of cigarettes.

7.3 Summary and Conclusions

This chapter has used data from the Living in Ireland Survey for 1998 to examine the distribution of smoking among different groups and to assess a number of hypotheses outlined earlier in this review. The descriptive tables in the second section of the paper showed clearly that men had a higher probability of smoking when compared to women, although we also found that young women had a relatively high rate of smoking, a finding that has been reported in other surveys both in Ireland and in the UK. However, among smokers, men tend to smoke more cigarettes on a daily basis.

The chapter then went on to examine the patterns of smoking by income status and social class. Earlier in this review we had seen that the relationship between income and tobacco consumption had changed in more recent periods such that higher income now tended to be associated with lower rates of smoking. Here we investigated whether the relationship between income and smoking may in fact be a proxy for other variables such as social class that are actually linked in a number of ways both directly and indirectly. Using descriptive statistics we saw that both income and social class are negatively related to the probability of smoking. However, it was not until we adopted multivariate methods that we could test whether these relationships were actually the result of confounding variables and whether other factors may be important.

In the final section of the chapter we used two equations to model both the probability of smoking and the number of cigarettes smoked. By estimating the effect of a number of variables simultaneously we found that income became insignificant in the presence of social class and education, suggesting that these factors are of more importance. Moreover, the addition of the GHQ12 variable showed that stress levels are positively related to the probability of smoking, even after

controlling for income, education and social class. In a similar fashion, when we estimated the effect of income on cigarette consumption in the presence of age and sex we, found no significant relationship. This result matches that of Conniffe (1995) and shows that income is no longer related to smoking to any significant degree.

8. SUMMARY AND CONCLUSIONS

8.1 The Absence of Research

It is hard to overplay the importance of research into the economics and marketing of tobacco both in Ireland and more widely given the now well-publicised effects of tobacco consumption: smoking is easily the largest cause of serious illness and premature death in Ireland accounting for approximately 7,000 deaths annually. Moreover, expenditure on tobacco in Ireland is huge totalling around 1.9 billion euro in the year 2000 which to put the figure into perspective is larger than the total expenditure (1.4 billion euro) on petrol, electricity, coal, peat and oil combined.

Given these facts one would expect that there is a large corpus of research available in Ireland that examines all aspects of how tobacco is marketed, who buys it, how this varies and its impact on individuals and society. In reality it has been startling to find that there is actually very little research that has been conducted and this is perhaps the major conclusion of this report. Though some areas, notably the relationship between the price of cigarettes and the level of consumption among adults has received some attention, other areas are almost unresearched. This is particularly true of issues such as the effects of advertising and marketing of tobacco on consumption and smoking among children.

Research on a number of topics is available from other countries and this goes some way, as we have shown, to answering important questions, but on many issues there can be no substitute for Irish research if we are to understand Irish circumstances and form coherent tobacco policies. Given the importance of smoking for public health and its central role in our lifestyles this lack of research is particularly disappointing and points to the need to foster interest in and provide funding for research in the area.

8.2 Price and Consumption

Of all the issues examined in this report, the relationship between the price of tobacco and the level of consumption has received the most research coverage in Ireland. This is partially because the information needed to examine one aspect of the issue is available publicly for free (and so easier to research), but also because the price/consumption relationship offers the possibility of decreasing smoking by raising the price of cigarettes

and tobacco through taxation. The crux of the argument lies in the size of "elasticity" of the relationship between price and cigarette consumption, i.e. the proportion change in consumption for a 1 per cent increase in price. This seemingly simple statistic is actually difficult to establish because of the differing assumptions and methodologies employed in Irish research papers, but recent research by Conniffe (1994) suggests an elasticity of around -0.39 , a figure which is very close to the average of -0.4 found internationally in a recent World Bank publication (Jha and Chaloupka, 2000). This means that a 10 per cent increase in tobacco price would lead to a 4 per cent decrease in tobacco consumption. Conniffe also found that the proportion of smokers was related to price with an elasticity of around -0.1 . Though not large, these elasticities reflect the average across the population and it may be that certain groups are more sensitive to price than others. For example, as we will discuss shortly, young people tend to be more sensitive to price than adults. It may be that those on lower incomes also have higher price elasticities. This means that for the 10 per cent increase in price just mentioned, about a quarter of the 4 per cent decrease in tobacco consumption would be because young people are deterred from becoming confirmed smokers and existing smokers are encouraged to stop completely. The other three-quarters of the effect of the price increase comes from smokers reducing their consumption, but continuing to smoke.

These conclusions are however reached on less than the best evidence. Rather than having information on individuals over time and relating the behaviour of these people to changes in tobacco prices, lack of research forces us to use aggregate information for the population as a whole and infer behaviour. Similarly, we have no real research among people from more disadvantaged social groups and how they respond to price changes.

8.3 The Changing Profile of Smokers

Chapter 2 showed that tobacco consumption has been falling since the early 1960s with the largest fall from the late 1970s until the late 1980s. We argued there that it was unlikely that this fall in consumption came about totally through the increasing cost of tobacco (though real prices did rise), but was mostly influenced by the increasing awareness of the damage that smoking causes as set out in government health education both in Ireland and abroad in tandem with restrictions on smoking advertising and tobacco use.

Evidence for this latter effect comes from a change that occurred in the relationship between people's income and their likelihood of smoking which occurred sometime shortly after 1960 when it seems that the relationship turned negative with those on higher incomes becoming less likely to smoke, and smoking less if remaining a smoker.

This trend has continued to the present such that there is now a clear inverse relationship between socio-economic group and propensity to smoke that has important implications for anti-

smoking policies. Once again there is no research on this important question, yet it seems plain that there are factors or processes that make those from lower socio-economic groups either more likely to start smoking (evidence is unclear) or less likely to quit once they have begun. This may be for a number of reasons, two of which were mentioned in Chapter 3. It was argued there that low life control and insecurity can lead to both psychological stress and increased fatalism, both of which may influence smoking behaviour. Though we present some evidence on these issues in Chapter 7, there is no systematic research for Ireland.

8.4 Smoking, Taxes and Health

There is no doubt that smoking is harmful to individual smokers and those around them, but the huge expenditure on tobacco coupled with the degree of taxation means that income from tobacco is an important source of revenue to government. The question addressed in Chapter 4 was whether this benefit to society outweighed the "cost" of the ill health and premature mortality brought on by smoking. In one respect this seems a ridiculous exercise since it is clear that smoking causes a huge amount of suffering that it is impossible to quantify, but advocates of smoking would argue that if people choose to smoke this is their choice and in purely monetary terms, if exchequer receipts and employment generated are larger than the costs to health services in dealing with the consequences of smoking, then it becomes a positive good to society.

However, Chapter 4 showed that the balance of costs and benefits could be tipped in either direction by the addition of any number of factors such as the costs to industry of employee illness. Given this, it is difficult to establish objective grounds for comparison. Instead we followed Conniffe's (1994) example and tried to establish the effect that government cessation targets would have on revenues. A hypothesised one-third decrease in the proportion of smoking achieved by price change alone would take an increase in excise tax above 80 per cent, but this increase in tax could not replace the revenue lost as the number of smokers decreased. In the short term then, the balance would seem to point in the direction of costs (though this may well be a price worth paying), however in the medium to long term as the benefits of cessation to health were realised this balance would swing back toward a more positive position.

8.5 The Advertising and Marketing of Tobacco and Children

Each year tobacco companies spend large amounts of money advertising and marketing their products and though the international evidence is not clear, it seems safe to assume that they believe that this expenditure is an effective method of gaining new customers. The contentious question is – is this marketing in some way aimed at, or unintentionally effective in recruiting children and adolescents to smoking? Tobacco companies argue

that they only target adults and existing smokers, yet as Chapter 6 showed, between 20 and 33 per cent of those aged less than 16 smoke with the proportion increasing with age. Evidence also suggests that whereas historically smoking among women was lower than among men, young women are increasingly likely to smoke compared to young men and this has been accompanied by increasing rates of heart disease and lung cancer among women (see Chapter 7). Chapter 5 discussed research showing the high level of cigarette advertising in women's magazines in Ireland and the positive impact this had on the numbers of pro-smoking articles in these magazines, but we have no direct evidence to link this situation to high rates of smoking among young women.

As with many of the other questions dealt with in this report, there is simply no research on this issue in Ireland, but research in other countries has found an association between advertising recognition and smoking among young people, but has not established the causal direction of this relationship. Similarly, positive associations have been shown to lead to higher rates of smoking and these may be linked to advertising.

Research in other countries suggests that smoking among children is an intensely social activity and little related to addiction compared to adults. This would suggest that they are more susceptible to advertising that acts through peer pressure by making smoking look attractive and adult. However, international evidence also suggests that price elasticities among children are higher than among adults, mostly because of their lower incomes, but also because they are less likely to have formed a strong habit or addiction. Given the importance of child smoking for future smoking prevalence it is particularly disappointing that there is so little research or systematic assessment of government initiatives. Longitudinal research in Ireland that measures exposure to advertising before take-up would be a substantial addition to our knowledge and contribute greatly to policy.

9. APPENDIX

In this Appendix we will examine the sampling frame and design of the survey used in Chapter 7 – the Living in Ireland Panel Survey. The LIPS Survey was designed to provide a nationally representative sample of the population resident in private households and to achieve this drew its sampling frame from the Register of Electors. This means that as the sampling frame is a list of persons registered to vote, this produces a list of electors, or persons, rather than households that leads to a particular form of sample bias that we will return to shortly. The sample itself was drawn using a two stage process using the ESRI's RANSAM system which allows the District Electoral Divisions (DEDs) to be stratified according to a number of important variables (province, urban/rural location and level of unemployment) before the first stage of sampling selects a population of these DEDs. In the second stage of sampling, a systematic sample of individuals is drawn from within the selected DEDs, or groups of DEDs (depending on a minimum population threshold) to produce the target sample. In the first year of data collection, 1994, the target sample was 259 clusters or DEDs each with 28 households yielding 7,252 households in total. In each subsequent year interviewers attempted to reinterview all the members of the households contacted in 1994 aged over seventeen, although this was not always possible as households and individuals could not be contacted, would not participate, had been institutionalised, or had died.

In 1994, of the 7,252 households originally selected for the sample, 166 were institutions or were ineligible for interview leaving an effective sample of 7,086 households. Of these households, contact could not be established with 609 households leaving 6,477 valid addresses that were contacted and 4,048 where actual interviews took place (28.2 per cent refused). This meant that 57.1 per cent of the effective sample were interviewed and 62.5 per cent of the valid contacted addresses. A total of 14,583 persons were members of these 4,048 households, 10,411 of which were eligible for interview and 9,905 of whom completed the full interview questionnaire (964 on a proxy basis). The 506 eligible people who did not respond represent less than 5 per cent of eligible persons in responding households. As Table 1 shows, the rate of subsequent non-response was heaviest in 1995, but continued to occur through to 1998, the year used in this report. In 1995, 89 per cent of the original completed households (3,584) and 86 per cent of the original individuals (8,532) were

reinterviewed, although some households and individuals were recruited in subsequent years. However, by 1998 the number of individuals interviewed had fallen to 6,324 (63 per cent of 1994) and households to 2,729 (67 per cent).

Tests have shown (Watson, 1999) that this attrition to the original sample has not been skewed in any particular direction, thus the data remain a reliable source of nationally representative information. However, even in 1994 the LIPS survey needed to be reweighted to be a true sample of the population, partially due to non-response, but also because the sampling frame of individual voters was not representative of households. These weights were then adjusted subsequently to take care of attrition in the sample and leaving us with a representative sample of the Irish population for 1998. The extent of attrition is shown in Table A1.

Table A1: Number of Completed Households in Each Wave, Number of Sample Persons in Completed Households and Number Interviewed, Living in Ireland Surveys 1994-97

	Wave 1		Wave 2		Wave 3		Wave 4		Wave 5	
Households			% Hsds		% Hsds		% Hsds		% Hsds	
Completed Households	4,048	3,584	80	3,174	82	2,945	87	2,729	84.7	
Non-response (NR)	3,038	794	18	624	16	388	11	445	13.8	
Non-sample	166	97	2	77	2	54	2	48	1.5	
Total Households	7,252	4,475	100	3,875	100	3,387	100	3,222	100	
Household response rate (excluding non-sample)			82		84		88		87	
Individuals			% Ind		% Ind		% Ind			
N. in Completed Hsds	14,585	12,649	84	10,939	85	10,013	89	9,045	89	
N in NR Households	—	2,286	15	1,781	14	1,066	9	1,048	10	
N in Non-Sample Hsds	—	117	1	219	2	215	2	116	1	
Total Individuals		15,052	100	12,939	100	11,294	100	10,209	100	
Eligible for individual Interview	10,418	9,049		7,935		8,482		6,620		
Interviewed	9,904	8,532	94	7,517	95	6,868	95	6,324	96	

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