

PROMOTING SMOKERS' WELFARE WITH RESPONSIBLE TAXATION

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INTRODUCTION

There are several possible rationales for taxing cigarettes and other tobacco products. Doing so will discourage smoking, which is of potential benefit both to the individual smoker and to society at large. Cigarette taxes also serve as a mechanism for raising money, as in the case of other taxes. Another potential advantage is that whereas most taxes, such as those on income, generate distortions and inefficiencies, cigarette taxes potentially could serve an efficiency-enhancing role in discouraging smoking behavior. Moreover, even if smoking taxes do cause economic distortions, they may create fewer distortions than the other available forms of taxation.

The focus of this paper will be on the role of cigarette taxes with respect to individual choice. I will not be concerned with externalities caused by second-hand smoke, societal health insurance costs that are increased by smoking, fetal damage, damages to nonsmokers by fires, and related effects. I am not neglecting these because they are unim-

portant or uninteresting from an economic standpoint. Rather, this restricted focus represents an effort to direct attention at a possible efficiency rationale for smoking taxation that has received little attention in the economics literature.¹

Taxing cigarettes as a form of sin tax has received increased prominence with respect to the debate over financing national health insurance. President Clinton has suggested imposing a cigarette tax as one of the mechanisms for funding his proposals. These taxes have been explicitly linked to the health effects of smoking. In contrast, cigarette taxes have long been imposed, but policymakers have not expressed as close a policy link to the health effects as in the recent debate. Clearly, taxation is but one step along a continuum toward a total ban of cigarette smoking. Taxes that are sufficiently high will eliminate smoking behavior, so one can view taxes as a mechanism for selecting the optimal degree of discouragement of smoking.

From the standpoint of individual choice, the rationale for such taxation is that individuals may not fully account for the effect of smoking on their well-being. In particular, there may be externalities to

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one's future self that are not fully accounted for in much the same way as we often neglect the externalities to others.² Just as economists have suggested Pigovian taxes for externalities to others, one could also impose externality taxes to account for damages to smokers' future selves. The optimal Pigovian tax is typically finite, and it also may be appropriate to impose a finite tax on cigarettes. Thus, the existence of adverse health effects from cigarettes, even possibly including death to the smoker, does not necessarily imply that an infinite tax is warranted. The probability of the outcome and the smoker's understanding of the consequences of smoking behavior enter as well.

The economic principle underlying my analysis is that taxation should be structured so as to promote smokers' welfare. We should not, for example, undertake taxation to maximize the well-being of smokers, assuming that they have the same preferences as our own. Rather, our task is to ensure that they are making sound decisions given their own preferences and tastes. Moreover, the taxes that we impose should be responsible in the sense that they should be designed to be consistent with this overall welfare-enhancing rationale. Sin taxes should not be regarded as a punitive instrument but rather as a mechanism for fostering sounder decisions. How we can best promote these objectives through cigarette taxes will be explored in detail below.

WELFARE CRITERIA FOR POLICY EVALUATION

The overall policy objective is to maximize the expected utility of the smoker if the smoker knew the true properties of cigarettes and made a rational choice. Consequently, we will not take the risk beliefs and choices of smokers as being necessarily fully rational. We will, how-

ever, make the usual economic assumption regarding consumer sovereignty and recognize that smokers' preferences matter.

Consider the following basic model in which an individual has income Y , can purchase cigarettes for a price P , receives a utility $W(Y)$ if he or she does not purchase cigarettes, a utility $U(Y - P)$ after smoking cigarettes and if healthy, and a utility $V(Y - P)$ after smoking cigarettes and after experiencing ill health effects. In the case of death, V would be a bequest function. I will make the usual assumptions that $U(X) > V(X)$; $U', V' > 0$; and $U'', V'' \leq 0$. The probability of these ill health effects is π . The expected utility given the actual risks of smoking is consequently given by

$$1 \quad (1 - \pi)U(Y - P) + \pi V(Y - P) > W(Y).$$

Smokers, however, may not fully understand the risks associated with their smoking behavior. If the smoking risks are assessed at some value q , which need not equal π , then they will choose to smoke if their perceived expected utility is positive, or

$$2 \quad (1 - q)U(Y - P) + qV(Y - P) > W(Y).$$

The potential market failure of primary concern, consequently, is that in which equation 2 is satisfied, but equation 1 is not. Thus, we are concerned with cases in which $q < \pi$, and people would not smoke if they knew the true π . Smoking behavior is currently potentially attractive to the smoker, but would not be if the smoker fully understood the risks entailed with the smoking decision. There also may be a market failure if $q > \pi$, and people do not choose to smoke now but would if they understood the

true risks. Efficiency losses result from these errors as well, but society's concern with errors in choice is clearly asymmetric.

Taxes can potentially align these decisions by discouraging smoking behavior even if the value of q is below π . In particular, suppose that there is some tax rate T imposed on cigarette smoking so that the individual will choose to smoke only if

$$\begin{aligned} &3 \\ (1 - q)U(Y - P - T) \\ &+ qV(Y - P - T) > W(Y). \end{aligned}$$

Clearly, by raising the value of T , one can eliminate all the situations in which equation 2 would be satisfied but equation 1 is not.

This property of taxes is not limited to the case in which there is a single homogeneous health effect. If for n possible adverse health outcomes, each of which has an associated probability q_i and a utility V_i , then smoking will be desirable after imposing cigarette taxes if

$$\begin{aligned} &4 \\ \left(1 - \sum_{i=2}^n q_i\right)U(Y - P - T) \\ &+ \sum_{i=2}^n q_i V_i(Y - P - T) > W(Y). \end{aligned}$$

One could respecify equation 1 analogously to ensure that taxes are set in a manner that will appropriately discourage smoking given their range of effects.

An additional complication of taxation is that the imposition of taxes will reduce the well-being of smokers. We may create a situation in which taxes have discouraged smoking by what would have

been an optimal amount given a tax-free world, as in equation 1. However, because of the imposition of taxes, people may choose to smoke even though their expected utility given taxes based on the true probabilities may be less than the expected utility of not smoking, or

$$\begin{aligned} &5a \\ (1 - \pi)U(Y - P - T) \\ &+ \pi V(Y - P - T) < W(Y) \end{aligned}$$

and

$$\begin{aligned} &5b \\ (1 - q)U(Y - P - T) \\ &+ qV(Y - P - T) > W(Y). \end{aligned}$$

The formulations above abstract from the temporal aspects of the smoking decision and have collapsed the problem into a single lifetime utility stream associated with different outcomes. A fuller exposition would note explicitly the multi-period aspect of the decisions and the possible forms of irrationality that could arise because of this long-term nature. The effects of smoking on health may be apparent fairly immediately, as in the case of shortness of breath or coughing, whereas long-run health consequences such as emphysema or death may take decades to develop. Smokers' decisions now consequently will affect their future well-being even if they choose not to smoke at this future time. Because of these temporal linkages, the weight that individuals place on future welfare as compared with present welfare, or their implicit discount rate, plays a central role in determining the rationality of their choices. If smokers exhibit temporal myopia in which they systematically neglect their future selves, then their decisions will not be rational.

The potential role of this temporal myopia is particularly pertinent within the

context of addiction. Quitting smoking is clearly costly and difficult. The U.S. Surgeon General formerly characterized these transaction costs as a "habituation," but more recently has elevated the costs to those of "addiction."³ Not all addictions are undesirable. In fact, recent economic literature has documented the potential for rational addiction, specifically with respect to cigarette smoking.⁴ However, when this addiction is coupled with faulty risk perceptions or inadequate weight to the future effects of smoking on one's well-being, then clearly individual decisions will not be ideal and the addictive aspect will be a legitimate issue of concern.

The focus of the discussion below will be on the accuracy of smokers' risk perceptions, since this is the central issue both with respect to the risky decision aspect of the problem as well as to the welfare loss associated with addiction. The weight that smokers place on future effects to their well-being will not be explicitly explored. However, we will examine the extent to which smokers are aware of the total long-term consequences of their actions in terms of lost life expectancy. Moreover, there is evidence in the labor market indicating that smokers are consistent in their risk-taking behavior.⁵ In particular, smokers exhibit a willingness to work on hazardous jobs that is greater than that of nonsmokers, which is what one would expect if smokers have different trade-offs associated with their risk-taking decisions. The compensation that workers receive per statistical injury in the workplace varies considerably depending on the population group. The average worker requires \$47,900 per statistical injury, whereas smokers require \$26,100 per injury, and nonsmoking seat belt users require the high amount of \$83,200. Workers appear to sort themselves into jobs requiring different wage

compensation per unit risk in a manner that is quite consistent with the differing attitudes in riskiness that are reflected in their smoking behavior. The consistency of smokers' behavior across different domains does not imply full rationality, as smokers may simply systematically neglect their health in all domains, not simply smoking. However, the empirical patterns that are observable accord with what one would expect to hold if smoking decisions were in fact rational.

PROFILE OF SMOKING RISKS

The starting point for the empirical analysis will be an assessment of the value of π , or the risks imposed by smoking. As in the case of virtually all health risks, a precise assessment of these values is difficult because of the long time lags involved and the problems of multiple causality. Rather than becoming involved in a debate over the merits of these risk assessment procedures, I will take the estimates provided by the Surgeon General at face value. To the extent that there are any systematic biases in these risk assessments, it is not clear that they are any different in character or in magnitude from risk assessments for other activities imposing health hazards.

The smoking risk survey information will be for two years, 1985 and 1991. Because scientists' assessment of the risks changed over this time period, the state-of-the-art scientific estimates of the smoking risks for each of these periods are included in Table 1. These figures have been calculated based on various estimates of the smoking death rates provided by the Surgeon General, where these death rates pertain to total lung cancer mortality risk to the smoker, the total mortality risk to the smoker, and the total mortality risk to society, including the risk to the smoker. The focus of this paper will be on the first two sets of risk ranges, but the third set provides

TABLE 1
ACTUAL SMOKING RISK RANGES IN 1985 AND 1991

| Survey Year | Lung Cancer Mortality Risk to Smoker | Total Mortality Risk to Smoker | Total Mortality Risk to Society |
|-------------|--------------------------------------|--------------------------------|---------------------------------|
| 1985 | 0.05–0.10 | 0.16–0.32 | 0.21–0.42 |
| 1991 | 0.06–0.13 | 0.18–0.36 | 0.23–0.46 |

a useful basis for comparison. It should be noted that in none of the annual reports of the Surgeon General was there any official government statement on the risks of smoking or any statement regarding the actual probabilities involved. Rather, there were reports of total numbers of smoking deaths, which I have divided by the pertinent smoking population to calculate a probability value.⁶ The total smoking risks have not been updated since 1991 so that these statistics continue to reflect current official perspectives on smoking mortality.

Somewhat surprisingly, there has also been very little explicit public pronouncement pertaining to the total loss in life expectancy attributable to smoking. The 1968 Report of the Surgeon General estimated that young male heavy smokers (those who smoke over two packs a day) expect to lose eight years of life and light smokers (those who smoke under half a pack per day) face a four-year life expectancy loss.⁷ More recently, the Surgeon General has indicated that those who die of smoking-related illnesses lose 20 years of life expectancy on average.⁸ Coupling this life expectancy loss with the associated probability of mortality that I have calculated above, one can calculate an estimated life expectancy loss for the average smoker ranging from 3.6 to 7.2 years.

The magnitude of these smoking risks is considerable, particularly compared to the other risks that are frequently the targets of government regulation and preventive efforts. Whereas smokers face

an annual risk of smoking-related mortality of about 1/150, the average annual risk to society at large of cancer from all causes is only 1/300.⁹ The overall risks of death from other prominent causes is considerably less, as motor vehicles pose an annual fatality risk of 1/5,000, job accidents pose an annual fatality risk to blue-collar workers of 1/10,000, and home-related accidents of all kinds pose a risk of 1/11,000.

There are also important morbidity effects associated with smoking. One manifestation of these effects is the adverse effect that smoking has on individual productivity. Smoking causes a variety of health effects that will tend to lower individual productivity, as has been estimated by several analysts.¹⁰ Smoking does, however, offer productivity-related benefits as well, as it provides for relaxation and other forms of enjoyment to the smoker. If smokers are aware of any adverse productivity effects, these influences will be internalized in the price of cigarettes. Smokers will pay less for the cigarettes to account for the productivity loss. This mechanism is similar to that for the mortality effects of smoking. The perception assessment below will focus on the mortality consequences of smoking, though ideally one would want to expand this assessment to ascertain whether the morbidity risk assessments and the productivity consequences are in line with the actual risks that are posed.

PUBLIC UNDERSTANDING OF THE RISKS

Assessing the accuracy of risk perceptions using publicly available statistics on

smokers' risk perceptions is not feasible because of the character of the risk questions. Surveys that inquire whether smoking "is/is not one cause of lung cancer?" or which make similar inquiries provide some insight into smoking risk awareness. However, even if the response to these questions is positive, such surveys do not resolve the issue of whether q is above or below π . Nevertheless, the qualitative information that is available suggests that there is widespread and increasing awareness of the risks of smoking. Throughout the 1950s, the Gallup poll results indicated that between 40 and 50 percent of the population was aware of smoking risks.¹¹ After the highly publicized 1964 government report on the lung cancer risks of smoking, the assessed belief that smoking was the cause of lung cancer escalated to 70 percent, and by 1977 this belief reached 81 percent. At the same time, 90 percent of the population believed that cigarette smoking was "harmful," and even 83 percent of the smoking population agreed with that judgment.

Smoking risks also have figured prominently in public assessments of the most important risks facing society. The U.S. Bureau of Alcohol, Tobacco, and Firearms (1988) report found that over 90 percent of the United States population believed that tobacco products were "somewhat/very harmful," which was a greater percentage than for any of the other products tested, including alcoholic beverages, food additives, and several other product groups.¹² Similarly, a study undertaken in Canada of the most important risks facing Canadian society addressed 38 different causes of death, ranging from cigarette smoking to nuclear power plant safety.¹³ Smoking risks were more highly ranked in terms of severity than any of the other risks considered, which is suggestive of a perception of the true risks associated with smoking.

To resolve this issue of whether the magnitude of the risk perceptions is sufficiently great, I will explore two different sets of survey data. The first data set is based on a national survey of smoking risks by the research firm Audits & Surveys in 1985. These results, which pertain to the lung cancer risk associated with smoking, appear in the first row of Table 2. Because the survey did not address whether the lung cancer risk would be fatal and also did not focus on the total smoking mortality risk, I undertook a broader survey in 1991; these results are reported in rows 2 and 3 of Table 2.

Although smokers' risk assessments are consistently below those of nonsmokers, as one might expect, their magnitude is nevertheless substantial. Overall, smokers believe that the chance of lung cancer and fatal cases of lung cancer is roughly one in three and that their overall chance of smoking-related mortality is almost a 50–50 proposition. Even if the high-end estimates of the risk in Table 1 are correct, smokers average risk perceptions are clearly not too low. Smokers overestimate the lung cancer risk by more than a factor of two, and they overestimate the total smoking mortality risk to smokers. Although the survey questions addressed the risk to smokers, the overall smoking mortality risk assessment is comparable to smokers also taking into account the mortality effects to nonsmokers as well.

In terms of the smokers' subjective probabilities, average smoker risk perceptions are quite high. Market failure, in terms of people smoking who should not smoke, will, however, be driven by the number of individuals who underassess the risk, not by the average risk assessment across the population. These potential errors, too, are relatively low. Focusing on the 1985 national survey results, for which the objective risk refer-

TABLE 2
SUMMARY OF SMOKERS' RISK PERCEPTIONS

| Risk Perception | Full Sample | Smokers |
|-------------------------------------|-------------|---------|
| Lung cancer risk (1985) | 0.43 | 0.37 |
| Lung cancer fatality risk (1991) | 0.38 | 0.31 |
| Total smoking mortality risk (1991) | 0.54 | 0.47 |

Source: Viscusi (1992, pp. 69 and 77).

ence point is a lung cancer risk value of 0.05 to 0.10, nine percent of the current smokers believe that the risk is below 0.05 and another five percent believe that the risk is below 0.10. Overall, approximately 14 percent of the smoking population underestimate the lung cancer risks of smoking, and the remainder either have accurate risk assessments or overestimate the risk.

There is also a widespread perception of the mortality risk associated with smoking. My 1991 survey found that the assessed mortality loss averaged 11.5 years overall, with smokers believing that the average mortality loss was 9.0 years.¹⁴ Smoking females, who have greater life expectancy than males, expect a total mortality loss of 10.9 years, whereas current male smokers expect a total mortality loss of 6.9 years. By these statistics, smokers either accurately perceive the life expectancy loss associated with smoking or perhaps slightly overestimate the loss.

A pivotal population group in the smoking debate is that of younger smokers. At the time when people embark on their smoking consumption behavior, are they aware of the risks that they are encountering? Assessing the answer to this question is particularly important because of the costs associated with changing smoking behavior.

The available evidence suggests that younger smokers actually have higher

risk assessments than their more senior counterparts.¹⁵ The 1985 national survey results indicate that for those age 16 to 21, the average lung cancer risk assessment is 0.49, which is 0.06 greater than that for society as a whole. Moreover, for smokers age 16 to 21, the average risk assessment is 0.45, which is 0.08 greater than that for all smokers. These results are what one would expect given the informational environment and the strong antismoking context in which these individuals have been raised.

It is also noteworthy for even younger age groups that there is substantial awareness of smoking risks. When asked whether "smoking can cause lung cancer," 99 percent or more of several age groups (seven to eight years, 10 to 11 years, and 13 to 14 years) all indicated that this statement was true.¹⁶ These results are in line with more recent research by several psychologists¹⁷ indicating that for a broad class of risks there is substantial risk awareness among adolescents. Quite simply, the standard characterization of youths as being uninformed and ignorant of the risks they face is not in line with either the evidence with respect to smoking risks or recent studies on the psychology of risk perception.

SMOKERS' RESPONSE TO RISKS

If cigarette smokers are in fact rational, an increase in the risk assessment associated with smoking should decrease the

probability of engaging in smoking behavior. In the 1980s alone, *per capita* cigarette consumption decreased by 25 percent.¹⁸ Whereas smoking behavior was once the norm, now fewer than 30 percent of the United States population smokes. This phenomenon may reflect a shift in smoking risk beliefs over time, though the changing social acceptability of smoking makes it difficult to isolate the risk perception effects.

Stronger evidence is provided by the linkages between lung cancer risk perceptions and the probabilities of smoking. These relationships are large in magnitude and statistically significant. Higher lung cancer risk perceptions reduce the probability of smoking. A useful index is the extent to which smoking rates would change if risk perceptions were altered. If, for example, all smokers estimated the lung cancer risk of cigarettes as being 0.05 (the lower end of the estimated risk range in 1985, the survey year), then smoking rates in society would rise by 7.5 percent. Even if their risk perceptions were reduced to 0.10 (the upper end of the assessed risk range), societal smoking rates would rise by 6.5 percent.¹⁹ Clearly, there is substantial responsiveness of smoking decisions to risk perceptions, though this test does not resolve the issue of whether this response is fully optimal.

Younger smokers are similarly affected, as they indicate the same degree of responsiveness to risk perceptions as do older age groups.²⁰ It is particularly noteworthy that age influences smoking in two ways. First, those in younger age groups have higher risk perceptions than those in older age groups. These risk perceptions have the same effect on the smoking probability for those age 16 to 21 as they do for older age groups.²¹ Moreover, there is an additional age-related effect on smoking. Controlling for risk perceptions and other determi-

nants of smoking behavior, those age 16 to 21 are less likely to smoke than those in older age groups. There is consequently a higher aversion to smoking on the part of those age 16 to 21 that is reflected in their higher risk perceptions as well as an age-specific drop in their smoking probabilities.

A final aspect of the linkages between smoking risk perceptions and smoking behavior is that those who believe that smoking is hazardous are more likely to select low-tar cigarettes. Those who smoke low-tar cigarettes (less than or equal to 3 mg tar per cigarette) are more likely to express concerns about the health consequences of smoking (87.1 percent), whereas those who smoke high-tar cigarettes (greater than or equal to 21 mg tar per cigarette) are less likely to express concern about health risks (54.8 percent).²² These linkages reflect a risk-related effort to target smoking behavior.

TAXES AND THE SMOKING DECISION

As was indicated in the formulation presented in the second section, Welfare Criteria for Policy Evaluation, if risk perceptions are inadequate, one can impose taxes to achieve the same discouragement of smoking as would perceptions of the hazards of cigarette smoking. Provided that smoking behavior is sensitive to the price, one can reduce smoking through cigarette taxes just as would occur if risk perceptions were greater. The statistical analysis underlying the results presented in the previous section enables one to calculate how much smoking probabilities would change in response to an increase in risk perceptions for any given change in smoking probabilities. One could similarly calculate how high excise taxes would have to be in order to achieve the same effect.²³

The consensus in the literature regarding the effect of prices on smoking behavior is that there is a strong and consistent negative relationship. The survey of 41 cigarette demand studies presented in Viscusi (1992)²⁴ indicates that the estimated price elasticity of demand for cigarettes ranges from -0.4 to -1.4 . The high demand elasticity estimate has been obtained by Lewit, Coate, and Grossman (1981), who found that teenagers are particularly responsive to cigarette prices.²⁵

The degree to which excise taxes discourage smoking is substantial. In 1985 (the year of the national smoking survey used as the basis for these estimates), the average national excise tax was 31 percent. In terms of the lung cancer risk equivalent of the effect on smoking, this excise tax is tantamount to a 0.17 probability of lung cancer if the demand elasticity ϵ is -0.4 , a 0.27 lung cancer risk level if the demand elasticity is -0.7 , a 0.3 risk value for an elasticity of -1.0 , and a 0.51 risk value for a demand elasticity of -1.4 . As of 1993, cigarette excise taxes averaged 31.4 percent of retail price, an amount that is not much different.²⁶

However, recent proposals to raise the excise tax by amounts ranging from \$0.75 to \$1.25 per pack would make the tax, as a percentage of retail price, roughly 80 percent. An excise tax amount of this magnitude would have the same effect in discouraging smoking as would a lung cancer risk perception of 0.42 ($\epsilon = -0.4$), 0.70 ($\epsilon = 0.7$), 0.96 ($\epsilon = -1.0$), and 1.28 ($\epsilon = -1.4$).

For the price-sensitive groups, such as teenagers, the discouraging effect of the taxes would be tantamount to believing that smoking necessarily led to lung cancer. Continuing smoking in the presence of such a prospect may appear to be unreasonable, particularly for nonsmokers,

though the magnitude of the risk is diminished by the deferred nature of the event, which shortens the amount of life that will be lost and leads to a discounting of these effects. Certainly, given the magnitude of current risk perceptions with respect to smoking, as well as the dramatic effects that recently proposed excise taxes would have in discouraging smoking, one would be hard-pressed to rationalize cigarette taxes as a mechanism for correcting smokers' inadequate perceptions of the risk. Justification for these taxes must be based on other person-specific rationales, such as a claim that smokers place an inadequate weight on their future well-being, or they believe that there are adverse effects on society at large that warrant such attacks.

International experience with a very high cigarette tax indicates that this tax often has other adverse social consequences as well. Canada imposed extremely high cigarette taxes, considerably higher than in the United States, leading to an average price per package of 25 cigarettes of \$6.33 in Ontario in November 1993. Of this amount, \$4.44 reflected taxes. As a result of these high taxes, a new class of cigarette-related criminals was created because of the substantial gain from smuggling cigarettes to evade the taxes. The smuggling problems were particularly acute from a political standpoint because of the involvement of various Indian tribes in the smuggling efforts. To eliminate such behavior, Canada reduced the cigarette tax amounts in 1994. In the case of Ontario, the price per pack dropped to \$3.36 in April 1994, with a tax amount of \$1.65 per pack.²⁷

Conclusion

Products such as cigarettes are attractive political targets for taxation because many view the consumption of these products as undesirable both for the in-

dividual smoker and society at large. However, even in the levying of sin taxes, there are limits to the extent to which we would want to discourage consumption behavior from the standpoint of enhancing the expected well-being of smokers. The optimal sin tax is not infinite, except in cases in which we want to ban a product. Current tax levels seem adequate from an efficiency standpoint. Indeed, for the great majority of smokers, no taxes are needed to enhance the efficiency properties of their decision.

Available evidence suggests that smokers are generally cognizant of the risks they face. Moreover, the limited segments of the smoking population who do under-assess the risk will be deterred from engaging in smoking behavior by the excise taxes now in place. These taxes have roughly the same influence as would accurate risk perceptions. The soundness of the risk perceptions does not, of course, rule out all potential forms of irrationality. However, it is clearly a fundamental concern, particularly to the extent that it is closely intertwined with the potential welfare losses that might arise from the costs of smoking cessation.

Cigarette taxes may nevertheless be attractive politically as a means for the majority of the population to extract resources from a minority. In addition, punitive taxes may be a political mechanism for eliminating smoking behavior. However, if that is the intended objective, it would be preferable to have an open debate on that issue rather than levying taxes based on nonexistent economic rationales. Adopting a ban is a much more direct and politically honest approach when the policy advocates' intent is to drive the product from the market rather than to promote efficient choices.

ENDNOTES

- ¹ There have been several attempts to assess the societal implications of smoking and the optimality of cigarette taxes from the standpoint of social externalities. See, for example, Shoven, Sundberg, and Bunker (1987), Manning *et al.* (1989), and Gravelle and Zimmerman (1994).
- ² For a lucid exposition of the nature of potential irrationalities with respect to smoking, see Schelling (1984).
- ³ The earlier habituation designation by the Surgeon General appeared in U.S. Department of Health, Education, and Welfare (1964). More specifically, the Surgeon General declared: "The tobacco habit should be characterized as an habituation rather than an addiction." Surgeon General C. Everett Koop elevated these transaction costs to that of "addiction." See U.S. Department of Health and Human Services (1988).
- ⁴ See in particular Becker, Grossman, and Murphy (1990) and Becker and Murphy (1988).
- ⁵ This evidence is based on my analysis of compensating differentials for job risks and is reported in Viscusi (1992). Also see Hersch and Viscusi (1990), Ippolito and Ippolito (1984), and Ippolito (1987).
- ⁶ The procedures that I used in carrying out these calculations are discussed in Viscusi (1992) on page 70, and in footnote 23 on page 85 of that book.
- ⁷ U.S. Department of Health, Education, and Welfare (1968). The estimate is cited in the 1989 Report of the Surgeon General.
- ⁸ U.S. Department of Health and Human Services (1989, p. 11).
- ⁹ These and other statistics from this paragraph are drawn from Viscusi (1992, p. 24).
- ¹⁰ See Manning *et al.* (1991), Gravelle and Zimmerman (1994), and the U.S. Environmental Protection Agency (1994).
- ¹¹ A detailed summary of all the Gallup poll results pertaining to cigarette smoking and government policy toward cigarettes is provided in Viscusi (1992, Ch. 3).
- ¹² Source: U.S. Bureau of Alcohol, Tobacco, and Firearms (1988, Table 2).
- ¹³ See the Canadian Department of National Health and Welfare (1993).
- ¹⁴ These results are reported in Viscusi (1992, p. 80).
- ¹⁵ See Viscusi (1992, Ch. 6). Also see Viscusi (1990, 1991).
- ¹⁶ For documentation as well as reports of addi-

tional questions regarding the risk perceptions for these age groups see Viscusi (1992, p. 121) and the original study by Schneider and Vanmastrig (1974).

- ¹⁷ See Beyth-Marom et al. (1993) and Jacobs-Quadrel, Fischhoff, and Davis (1993).
- ¹⁸ See Viscusi (1992, p. 53).
- ¹⁹ See Viscusi (1992, Ch. 5, p. 100).
- ²⁰ See Viscusi (1992, Ch. 6 and 7).
- ²¹ See Viscusi (1992, p. 133).
- ²² See Mulholland (1991) and Viscusi (1992).
- ²³ The smoking probability risk perception results pertain to the probability of smoking, whereas the excise tax results are linked to the overall demand for cigarettes. Harris (1980) also discusses the potential role of cigarette taxes.
- ²⁴ See, in particular, Tables 5 and 6, which summarize the previous studies and their findings.
- ²⁵ The study by Wasserman et al. (1991) fails to find a difference between teenagers and adults. There remains some controversy over the estimation of the teenager effect. See Grossman (1991).
- ²⁶ See Tobacco Institute (1994, p. 188).
- ²⁷ These data were drawn from the Canadian Tobacco Manufacturer's Council.

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