

Smoking and the Public's Health

Cigarette smoking is the number one preventable cause of premature death. Smoking is a major source of mortality and morbidity in the United States and in other countries, causing various forms of cancer, heart attacks, chronic obstructive pulmonary disease (COPD), and stroke. Yet almost fifty million Americans smoke (Ho 1998). Mortality from certain smoking-related diseases, such as lung cancer, has risen over the past few decades at the same time as mortality from some other causes has declined. Trends in morbidity and resource costs attributable to smoking are more difficult to monitor, but they plausibly parallel mortality trends.

Compared to the rest of the world, the United States has made considerable progress in reducing the magnitude of the burden imposed by smoking, but still has a long way to go (Jones 1996). The good news is that by 2000, per capita cigarette consumption among adults was only half the peak reached in 1963 (Wray et al. 1998). The bad news is that although seventy percent of smokers say they want to quit and thirty-four percent of smokers make an attempt to quit in any given year (Taylor et al. 2002), only 2.5 percent of U.S. smokers succeed in quitting each year (Miller et al. 1997). With fifty-one million Americans who still smoke, this means only about 1.3 million quit smoking annually.

Particularly troublesome is that even as youth perceptions of the risk of smoking and youth disapproval of heavy smoking rose during the latter half of the 1990s, heavy cigarette use generally rose among high school seniors during this same period (Rice et al. 1986). The percent of twelfth graders who said that they smoked increased 1991 through 1997, then declined through 2000 (Sterling, Rosenbaum, and Weinkam

1993, p. 178). As more than three-quarters of smokers begin smoking before age 19 (Centers for Disease Control and Prevention 1997) and many begin their habits in their early teens (Leu 1984; Manning et al. 1989), trends among minors in particular merit monitoring.

Smoking Benefits and Costs and Public Policy

Smoking and smoking policy have been analyzed from a number of alternative but partially complementary perspectives. From a medical standpoint, smoking is one of the most hazardous health behaviors. Physicians routinely counsel their patients who smoke to quit. Practice guidelines for smoking cessation exist and have been widely disseminated. Similarly, from the vantage point of public health, smoking is the major cause of mortality and an important source of morbidity and long-term disability. Such concerns have led public expenditures on tobacco control programs, restrictions on access to cigarettes, especially to youths, bans on advertising of tobacco products, and increased excise taxes on cigarettes. To the extent that smoking is viewed as an absolute “bad,” it seems unnecessary to quantify costs attributable to tobacco consumption.

An alternative view, shared by most economists, is that people are the best judges of the goods and services they consume. This view is incorporated in the doctrine of “consumer sovereignty.” In determining what and how much of each good and service to consume, people weigh benefits accruing to them personally with the costs. Both the benefits and costs are private. Costs include the price of the good or service, but also later consequences, such as effects on health in later life. At the same time, consumption contributes to the person’s utility or well-being. In the context of cigarette consumption, people smoke because they enjoy it, for relief of stress, to display their maturity or sexuality, to satisfy an addiction, and for other reasons.

If one accepts the doctrine of consumer sovereignty, only those benefits and costs from the person’s consumption that are external to the individual are relevant for public policy decisions. There are few external benefits of tobacco consumption. Some might list employment opportunities in tobacco growing, manufacturing, and sales as external benefits, at least in the short run until such resources can be allocated to alternative uses. There are two major types of external cost—(1) adverse health effects and discomfort that smoking imposes on others and (2) the financial burdens from smoking-attributable illnesses that

are borne by others in addition to the smoker. A third, somewhat more controversial external cost, is loss in well-being that a nonsmoker suffers from just knowing that others smoke. This third type of external cost is inconsistent with consumer sovereignty. Its existence presupposes that smokers should know better or that they are simply too addicted to quit.

Social benefit is the sum of private benefits to each consumer of the product plus the external benefit. Likewise, social cost represents the sum of private costs incurred by individual consumers as well as the external cost.

In the past, based on an assumption of consumer sovereignty, economic studies of the cost of smoking have focused on its external cost. The fact that people decide to smoke suggests that, at the margin, private benefits cover private cost. Knowing the external cost is useful for determining optimal levels of excise taxes on tobacco products.

The assumption that people are sovereign consumers of tobacco product is likely to be violated under several conditions. First, consumer sovereignty presumes people know the private benefits and costs of the goods and services that they consume. But smoking imposes costs on the smoker that are not likely to be anticipated, particularly since much of such cost occurs late in the life cycle—many decades after the smoking habit is typically initiated. A value in documenting the private cost of smoking is its use in informing adolescents and young adults about costs they are likely to face as they age.

A second circumstance under which consumer sovereignty is violated is that consumers may lack self-control over their consumption decisions. Financial call-in radio and television programs often receive calls from people who would like to control their credit card debt but cannot. Others say that they want to lose weight and sometimes succeed, but only temporarily. Heavy drinkers or smokers may say that they want to quit, but they experience problems in follow-through. Such self-control problems are inconsistent with consumer sovereignty (Manning et al. 1991; Harris 1997a). By discouraging consumption, excise taxes and smoking bans are devices that can help smokers deal with their self-control problems. Under such circumstances, internal or private costs as well as external costs are relevant to setting the optimal level of the excise tax and for computing the benefit of a public tobacco control program.

In general, economists consider costs borne by the household to be private. Household and individual decision making are viewed as

virtually interchangeable. In the microeconomics of household behavior, the distinction has largely been a matter of mathematical notation. Implicitly at least, every family member is assumed to have identical preferences. Or, at a minimum, a smoker is presumed to have incorporated all preferences of other family members in decisions about how much to smoke.

In the past two decades, economists have begun to model interactions among household members, especially between spouses (see chapter 10). This research is motivated by the notion that spouses' preferences differ. Bargains are struck that involve trades between spouses regarding consumption of commodities from which they may derive different levels of utility (or lack of utility). There is an outside option of dissolving the marriage, but many couples will remain married having resolved their differences through bargaining. In the context of smoking, for example, a husband may continue to smoke, and this is a source of aggravation to his wife. In trade, the two may agree that the wife can take a trip to Hawaii with a girlfriend. To the extent that this bargaining process within the household market functions well, health and aggravation effects of smoking on the spouse, as well as the financial burdens of smoking shared by both spouses, may appropriately be viewed as internal.

An alternative viewpoint is that, in the case of smoking, costs borne by household members other than the smoker should be viewed as external. Maternal smoking has potential adverse effects on offspring, and youngsters with smoking-related health problems sometimes become adults with such problems. Persons have no bargaining power before birth or as infants or young children.

Even when bargaining power is likely to be more equal, smoking by one spouse may adversely affect the health of the other spouse (chapters 3 and 10), and, in the United States and in many other high-income countries, a high percentage of marriages dissolve. Then at least some of the financial burden generally absorbed by households as between spouses, may be shared by others. Also, some spouses, such as wives with low earnings potential, may have few options outside of the current marriage. In such cases, acceptance of the results of household bargaining may violate social norms. In this study, we will take an agnostic view about how to count the cost that smoking by one spouse imposes on the other spouse. To distinguish these costs from other private costs, we will refer to them as "quasi-external" costs and identify them in a separate category.

Governments' Role in Markets for Tobacco Products

For a good or service in which the consensus is that consumption has no important externalities, there is no role for government intervention. In fact, in most markets, governments play at most a minor role. But when these circumstances do not hold, government intervention is warranted.

First, to deal with externalities, one appropriate government response is to levy a tax on use, in effect marginally raising cost to provide a disincentive for consumption of the product. Another policy is to ban consumption especially in certain locations, such as schools, workplaces, and places where people congregate.

Apart from concern about adverse health effects on nonsmokers, there is concern that nonsmokers pay for the smoking-attributable cost in the form of higher insurance premiums, contributions to social insurance programs, such as Social Security, and higher taxes to support programs such as Medicaid (see Harris 1997; Max 1997a,b,c). But especially considering the cigarette excise taxes smokers pay as well as payments from the Master Settlement Agreement (MSA) between states and major tobacco companies (which have been shifted forward to consumers in the form of higher product prices), whether nonsmokers subsidize smokers or the reverse is no longer clear.

Second, governments may intervene to correct distortions in information flows. Decades ago, tobacco manufacturers advertised that "more physicians smoke Camels than any other cigarette," and "you can't help inhaling, but you *can help your throat!* Call for Philip Morris."¹ Such messages conveyed the idea that smoking was not harmful to one's health. Such advertisements may seem amusing, but five decades or so ago, they were both "informative" and reassuring to readers. By contrast, in certain sectors, most notably pharmaceuticals, the federal government only permits companies to make those claims that are substantiated by evidence from randomized clinical trials. In such cases, the government response is information regulation, rather than taxation (see, e.g., Miller et al. 1997).

The empirical evidence on advertising as a determinant of smoking has been debated and investigated at length. In brief, the empirical evidence is mixed (see e.g., Miller, Ernst, and Collin 1999; Rubin 1997), in spite of frequent advertising suggesting that smoking the advertised product yields benefits and is safe. Complicating the picture is that information about the underlying risk has not been constant but

rather has evolved during the course of the twentieth century. During the first half of the century, although harm from smoking was suspected, there was a paucity of empirical evidence, much analogous to information on the health effects of cell phone use today.

An important characteristic of tobacco consumption is the long latency period between the time of initiation and the onset of adverse events. Relatively few adverse health events occur before late middle age. To illustrate, at age 35, the cumulative probability of survival is the same for those who have never smoked and smokers. At age 45, the ratio of such probabilities, those who have never smoked to smokers, is 1.02 for males and 1.00 for females. The lower ratio for females may reflect an average higher age of onset of the smoking habit than males. At age 55, the corresponding ratios are 1.06 for males and 1.02 for females, and at age 65, the ratios are 1.18 and 1.08, respectively. By age 85, the ratios are 2.11 for males and 1.57 for females (Rice, Kelman, and Durmeyer 1990, p. 91). Excess morbidity and consequently elevated cost occurs earlier, however, for some smoking-related diseases such as lung cancer; for this disease, the lag between initial treatment and death is less than a year on average (Hartunian, Smart, and Thompson 1980; Gold, Gold, and Weinstein 1996).

The third kind of justification for government intervention occurs when assumptions underlying the doctrine of consumer sovereignty are violated. But in the context of smoking, people may be ill informed about the underlying risks, myopic (not forward-looking), barred from acting by their underlying addictions or other reasons, or simply lacking in self-control over consumption decisions (Freeman 2003; Diamond and Hausman 1994). Under such circumstances, a tax on use could be implemented to discourage consumption, especially if smoking cessation aids marketed by the private sector are viewed as insufficient to assist smokers with their problems of self-control. A government ban on sale of the product as occurred during national prohibition of manufacture and sale of alcohol during the 1920s and early 1930s, may also be justified on this basis.

The argument is that people who know that they will have trouble in the future with self-control may actually favor externally imposed controls over their decisions. In the context of public assistance, a time-inconsistent potential recipient may actually favor statutory time limits on eligibility for welfare. In the context of smoking, a smoker may be better off with an increase in the state excise tax. Under standard

models, smoker well-being clearly is worsened by a tax increase of this sort (Diamond and Hausman 1994).

Equity and Smoking Policy

Another goal of public policy is fairness. The equity principle relates to the just distribution of the burden of smoking based on smoking status or some other basis such as income. Equity is a much less studied aspect of tobacco control policy.

The equity principle has both “horizontal” and “vertical” dimensions. All other things equal, horizontal equity requires that people in equal circumstances (e.g., with equal incomes) pay the same tax. There is no consensus on what constitutes vertical equity, how much tax an affluent person pays relative to a less affluent person, except that it is generally undesirable for those with low incomes to bear a higher relative tax than those with higher incomes. Cigarette taxes are well known for being regressive in their impact, in part because the odds of smoking among poor adults are three-fifths higher than among non-poor adults (Kunreuther, Novemsky, and Kahneman 2001). Moreover, in contrast to the assumption underlying traditional analyses (that prices rise by the same amount as excise taxes), for various reasons cigarette manufacturers may use excise tax increases as an opportunity to raise retail prices by more than the increase in tax rates (Warner et al. 1995; Chaloupka et al. 2000). Empirical evidence supports this view. Such “overshifting” therefore worsens any regressive impacts of such taxes. On the other hand, Cutler et al. (2002) have argued that although the poor pay a higher fraction of their income in cigarette excise taxes, as smokers they also benefit disproportionately from the reduction in mortality and morbidity brought about by the drop in consumption that excise taxes cause. Finally, concerns about equity also motivate other policy interventions, such as inclusion of smoking cessation programs under Medicaid.

The Relationship of the Private and Social Cost of Smoking to Public Policy: Four Examples

Public policy decision makers cannot properly gauge the extent to which policy contributes either to efficiency or equity without accurate estimates of the costs of smoking. We agree with Meier and Licari

(1997) that rather than guiding public policy, estimates of smoking-attributable cost often have been developed by advocates of a particular policy position, not as a guide to appropriate policy but rather as support for a position developed independently of the estimates. Thus, rather than serve the analytic purpose of guiding public policy in setting taxes, determining appropriate amounts of compensation in tort litigation, and assessing social returns from public programs that discourage initiation or encourage cessation, the estimates are in effect weapons, either to attack adversaries who oppose one's position or to be used in self-defense. Even though an extensive literature covers the costs of smoking (see chapter 3), we began this study without any preconceived notions of what the costs might be.

Tobacco policy relies on a combination of information, incentives ("carrots"), and regulations ("sticks") on both the demand and supply sides of the market to steer it toward an efficient level of tobacco consumption. Although the principal goal of smoking control efforts is to improve health, which individuals' health might be improved depends critically on the policy instrument selected. This in turn depends on the rationale for intervention. Of all those harmed by smoking, the victims most in need of public protection arguably are children; indeed, the public health community and economists appear to have consistent views on this (Chaloupka et al. 2000; MacKensie, Bartecchi, and Schrier 1994). The rationale for focusing on children stems from concern about the external effects of smoking on infant health and development and on children who grow up in a home in which adults smoke, as well as the notion that, in the context of smoking, the necessary conditions for relying on consumer sovereignty probably do not apply in the case of children and adolescents. However, interventions that target only children and adolescents are unlikely to be effective in isolation; some of the most potent interventions, such as cigarette taxes, unavoidably will reduce adult consumption as well (U.S. Department of Treasury 1998; Harris 1993). Also, parents have a major influence on the smoking behavior of their children (Passell 1993; Gravelle and Zimmerman 1994).

Volumes have been written about U.S. tobacco policy (see e.g., the many reports of the U.S. surgeon general; Tollison 1994; National Center for Health Statistics 2001; and many others). Rather than rehash what is already known about the extent and effectiveness of various policies, we focus here on the extent to which cost estimates either have been used to develop or might be needed to improve current policy. Some relevant policy applications are tobacco excise taxes,

smoking cessations aids, tobacco litigation and allocation of tobacco settlement funds, and forecasting contributions for and expenditures on major social insurance programs, especially Social Security and Medicare.

Tobacco Taxes

Tobacco taxes are an extremely potent policy instrument. Extensive analysis has revealed a typical aggregate demand elasticity of -0.3 to -0.5 and further has suggested that the participation price elasticity is roughly half the demand elasticity (Orzechowski and Walker 2002; U.S. Department of Health and Human Services 2000a; Rigotti 2002). Many existing studies of the impact of taxes on demand for cigarettes have not taken into account that states may raise excise taxes on cigarettes when demand for this product is high ("endogeneity" of taxes). The handful of studies that correct for endogeneity show that tobacco taxes have roughly double the impact on demand than was found previously in studies that did not make this correction (Silagy et al. 1998; Ranson et al. 2000). Evidence is mixed on whether prices influence the probability of initiating smoking or quitting (U.S. Department of Health and Human Services 2000a).

Tobacco taxes have been the subject of extensive research and discussion regarding how to determine the optimal level.² The conceptual task of setting the optimal cigarette excise tax rate is quite complex. As noted above, the optimal tax would force the potential smoker to consider the cost of all consequences smoking imposes on others. To the extent that smokers are irrational and myopic, the optimal tax would reflect private costs of smoking as well. Thus, to determine the optimal rate, one needs to both understand choices people make about smoking as well as quantify the external and perhaps the private costs of smoking. Private costs far exceed the external costs of smoking. Thus, one's assessment of the extent that smokers are rational and forward-looking or irrational and myopic has an important bearing on what the socially optimal excise tax should be. Equity considerations add further complications, because an economically efficient tax may be viewed as inequitable.

As will be discussed in more detail in chapter 3, the general consensus from studies as of the mid-1990s was that, using a three percent discount rate, smokers generally more than "paid their own way" when only financial costs (such as medical care, Social Security, and

retirement) were taken into account, that is, smokers end up subsidizing nonsmokers by nearly 25 cents a pack because any higher medical costs experienced by smokers are more than offset by the reduction in retirement and Social Security payments that result from their earlier deaths (updated figures from Hu et al. 2000, reported in Nielsen and Fiore 2000, and Viscusi 1999). This conclusion was based on an assumption that smokers should pay for costs imposed on others outside their households and not costs imposed on other family members or purely internal costs.

Even when intermediate estimates of loss of life from lung cancer and heart disease attributable to environmental tobacco smoke (ETS) were taken into account, smokers subsidized nonsmokers by 9 to 11 cents a pack (Cutler et al. 2002). Others concluded that costs of maternal smoking alone amount to 42 to 72 cents per pack (Price and Dake 1999), while others placed this cost as high as \$4.10 per pack in 1990 (Wilson 1999). By far, the largest cost stems from the average loss of years of life for smokers—an amount equivalent to \$22 per pack undiscounted and \$6.63 per pack when discounted at five percent, costs that become relevant for public policy when assumptions underlying consumer sovereignty are violated.³

According to Cutler et al. (2002), smokers lose an estimated two hours of life expectancy per pack—a loss whose undiscounted value amounts to \$22 per pack. At issue is whether smokers obtain \$22 worth of pleasure from smoking a pack or whether they instead have underestimated the risks associated with smoking. If they do not, excise taxes on cigarettes should be much higher than they are now.

A skeptic of the view that excise taxes are too low is W. Kip Viscusi, a professor at Harvard Law School. Viscusi (Sims 1994) estimated that, as of the mid-1980s, state excise taxes' deterrent effect was equivalent to the effect of a smoker's believing that his or her lifetime risk of getting lung cancer from smoking was anywhere from 17 percent (assuming an elasticity of -0.4) to 51 percent (assuming an elasticity of -1.4 , a figure sometimes cited for teenagers). The actual lifetime risk of lung cancer for smokers was only five to 10 percent; moreover, smokers responding to a survey he described assessed this risk at 37 percent on average. Thus, state cigarette taxes inflated an already exaggerated risk by roughly 50 to more than 100 percent. In short, excise taxes more than compensated for any health information gaps that might lead smokers to erroneously continue their behavior.

Previous studies generally concluded that overall, smokers pay more in the form of excise taxes than the losses they generate. Yet excise taxes are rising in most nations, as are prices of cigarettes. Obviously, public policymakers do not seem to be paying much attention to such calculations. Should they? What does our empirical analysis imply for resolving disputes of losses allegedly due to smoking via tort claims? Our results likely will have major implications for tort claims currently pursued by various parties including state Medicaid programs. It is important to compare the evidence with the parties' arguments.

Under the best of circumstances, objective analysis is only one input into the policy decision-making process. Another consideration is politics. For example, although U.S. Public Health Service (PHS) scientists had concluded as early as 1957 that lung cancer was caused by smoking, the PHS rejected tobacco-related public health actions, such as placing warning labels on cigarettes. One possible reason was the prospect of loss of congressional support and funding if the PHS took a more aggressive stance (Watson et al. 1995).⁴

Smoking Cessation Aids

More than two-thirds of current smokers report wanting to quit, but only 2.5 percent actually quit in a typical year (Oster 1996). Smoking behavior for motivated individuals can be influenced by subsidizing activities related to smoking cessation, including physician advice, counseling, and pharmacotherapy. Nicotine replacement therapy (NRT) takes various forms (chewing gum, transdermal patches, nasal spray, and vapor inhalers), and has been demonstrated in numerous studies to increase a smoker's chances of quitting (Hopkins and Lynch 1997). Such products were sold only by prescription until 1996, but today most sales are over-the-counter (Harris 1997a).⁵

If smokers paid for such help in full and we could fully rely on consumer sovereignty in this context, an explicit calculation of the benefits of quitting by someone other than the smoker would be unnecessary. But health insurers do consider covering such help, and individual smokers may be ill informed about the benefits of quitting. Thus, quantitative estimates of the benefits to be derived from smoking cessation are useful. In the discussion that follows, we intend to emphasize applications of the calculations rather than the results of past

studies. As reported in later chapters, we have developed our own estimates for many effects of smoking.

Smoking cessation is particularly important for Medicaid because the rate of smoking is roughly 50 percent higher among Medicaid recipients than the general population (Harris 1997). Although the U.S. Centers for Medicare and Medicaid Services (CMS), the agency that runs the Medicare and Medicaid programs, could in principle either mandate or exclude Medicaid coverage for clinical services for smoking cessation or NRT, to date it has done neither—leaving it to individual states to decide whether such services should be covered for smokers generally or particular subgroups (e.g., pregnant women).

Likewise, Medicare could elect to make such services covered under Medicare, but to date has not done so. Such services are optionally covered by some of the plans offered under the Federal Employees Health Benefits Plan (FEHBP); the fee-for-service plans generally cover up to \$100 per member per lifetime toward the cost of enrollment in one smoking cessation program.⁶

Although employers generally may be reluctant to interfere with private activities of workers, they may have a financial stake in altering behaviors affecting a worker's own productivity and that of others. Kristein (Max 1997a) estimated that a typical smoker imposed a cost of \$336 to \$601 on the employer, taking into account the effects on excess health insurance costs, higher absenteeism, productivity losses while working, excess workers' compensation costs, increased occupational health costs, higher life insurance costs, and fire losses. Roughly half of this was borne in the short term (1–3 years) and the balance were longer-term costs that could be fully "recaptured" only if the employee remained with the same employer for 10 to 15 years. Kristein showed that under various assumptions, the rate of return on a smoking cessation program could range from 25 to 100 percent. Max (1997b) used a simulation analysis for a large manufacturing firm, showing that a work site smoking cessation program will generate financial returns exceeding the program's cost, taking into account returns in the areas of medical care, absenteeism, on-the-job productivity, and life insurance.⁷

In these applications, the desirability of paying for smoking cessation services depends on which costs and benefits are included. An employer will want to consider as benefits costs averted that are not borne by the employee as well as savings attributable to reduced employee turnover, assuming that employees value the benefit. In any case, the calculation involves private costs and benefits. For Medicaid

and Medicare, the ideal calculation is more complex. In a narrow sense, one would cover a smoking cessation service if the savings in outlays for other care, appropriately discounted, would cover the cost of offering the service. Cost offsets, however, constitute too narrow a view of the benefit. Savings in nonmedical costs, such as work disability, are also an appropriate part of the benefit calculation.

Tobacco Litigation and the Tobacco Settlement

In recent years, private and public parties have sued tobacco companies (Max 1997c; Miller 1997a,b; Oster 1997a). Two parts are essential to a tort claim: establishing liability and determining damages. Liability depends on a finding of harm to the defendant, an action or inaction on the part of the defendant causing the harm, and a finding of failure to exercise due care, that is, negligence. Estimates of the cost of smoking are directly relevant for establishing the amount of damages. As far as determination of liability is concerned, studies of the cost of smoking establish that damage occurred. Also, for damages to be attributable to smoking, it is necessary to establish causation.⁸ In litigation with individual smokers as plaintiffs, it is not only required that smoking caused the loss, but that the tobacco manufacturers were at least partly responsible for the fact that the person smoked by deceiving people about the benefits and especially the private cost of smoking. There is controversy about whether smokers were misled by cigarette company advertising. The cost studies do not take a position on this issue.

Viscusi (Oster 1997b) in particular has persuasively argued that the settlements in the late 1990s between the states' attorneys general and the major cigarette manufacturers, the most important of which being the Master Settlement Agreement (MSA) between forty-six states' attorneys general and the major cigarette manufacturers (MSA), were not based on careful and detailed assessments of smoking-attributable cost. Both he and we argue that if compensation was not based on such assessments, it should have been. As the door on future tobacco litigation is not closed (only closed for the states and even then it is useful to learn from past experience), there is room for the use of such assessments in resolving ongoing and future litigation. And rather than serve as a bad example of damage determination for litigation in other areas, such as against gun manufacturers and fast food restaurants, the opportunity for a midcourse correction still remains.⁹

The relevance of estimates of the cost of smoking for establishing damages, conditional on a conclusion that the defendant is liable, is clear. In contrast to much other public policy relating to tobacco control, cost estimates played a central role in determining the final amount of the settlement. The heart of the settlement are annual payments designed to compensate states for Medicaid damages. A number of different studies were developed, many of which were used on both sides of the litigation process.¹⁰ Some retrospective analyses of the settlement have been done using state data: Schumacher 1996 (Massachusetts); and Harrison 1998a (Massachusetts). The standard method used in nearly all of these studies was to estimate the smoking-attributable fraction of Medicaid expenditures based on the excess medical costs of smokers compared to nonsmokers at a slice in time. Some of the more sophisticated models also accounted for the impact of parental smoking on medical costs for children (e.g., Harrison 1998b). One retrospective analysis concluded that the overall savings to Medicaid that can be expected as a result of smoking reductions through the year 2025 will amount to only about one percent of all Medicaid spending attributable to smoking during that period (Harrison 1999).

Proposed and actual settlements between tobacco manufacturers and the states have been vociferously criticized on legal grounds (Hanson and Logue 1998; Levy 1998a,b) and on antitrust grounds, on the view that they have facilitated collusion among the companies to raise prices, ultimately benefiting plaintiffs (states), lawyers, and defendants at the expense of consumers (Federal Trade Commission 1997; Bulow and Klemperer 1998). Viscusi (1999, 2002) sharply criticized the approach used in the MSA, arguing that by focusing only on short-term medical cost differences between smokers and nonsmokers, this settlement does not account for the substantial savings states receive in their nursing home and pension costs due to the reduced life expectancy of smokers. His calculations showed that literally every state saves money on smokers; moreover, even if one restricts the analysis to pure medical losses (leaving aside nursing home and pension losses), most states will receive from the MSA more (in some cases 2.9 times as much) than their actual medical losses.

Yet others have criticized the MSA on grounds that it is not at all clear what the payment is intended to cover (e.g., a payment for past harms vs. a payment for future expected harms) and on grounds that the implicit excise taxes that will result from the settlement are too low

to fully account for externalities arising from addiction and inaccurate personal risk perceptions among smokers (see Hanson and Logue 1998 for a discussion of the proposal settlement that preceded the MSA). These authors have proposed a comprehensive alternative to the settlement—a smokers' compensation system—that purportedly would create incentives for tobacco manufacturers to reduce the harms associated with tobacco rather than seek ways to evade the letter and spirit of the settlement (Hanson, Logue, and Zamore 1998). We will eventually find out whether the MSA becomes an enduring feature of the tobacco regulation landscape or is ultimately swept away by alternative approaches.

Future Solvency of Social Security and Medicare: Forecasting Future Contributions and Expenditures

Ironically, although promoting good health habits such as smoking cessation may be good for Americans' health, this may be bad for Social Security's and Medicare's future financial health, as will be apparent from results we present in this book. This does not mean that promoting health is not a desirable public policy objective, but rather that this objective comes at a cost. Having estimates of impacts of smoking on cash flows accruing to Social Security and Medicare are important for documenting the trade-off.

Goals of This Book

This book has three objectives: (1) to calculate the cost of smoking updating previous estimates using a new data set, which allowed us to follow smokers and nonsmokers longitudinally and to assess some types of cost that have not been analyzed in detail before; (2) to analyze the consequences of smoking from standpoints such as the effect on morbidity, functional states, and other health outcomes; and (3) to tally the cost of smoking, identifying the major contributors to the private and social cost of smoking.

Improved Estimates of Private and Social Costs of Smoking over the Life Cycle

The primary purpose of our study is to provide a comprehensive analysis of the cost of smoking and incidence of such cost within

the context of a rigorous normative framework. The magnitude of smoking-related costs is relevant not only for guiding the wide range of current policies aimed at smoking, but also for improving management of public programs that cover a growing share of the U.S. population, for example, pregnant women, children, the aged, the blind, the disabled, and single parents under Medicaid, the elderly and disabled under Medicare, and federal employees, retirees, and their dependents.

We evaluate private and social costs of smoking for men and women who smoke at age 24. Many of the smokers will quit before they die, many long before this, a factor accounted for in our analysis. But, especially for those persons who quit after smoking for many years, and those who never quit, health and financial consequences are long lasting if not permanent. We selected age 24 as the base year to focus on adult smoking. Many teenagers experiment with cigarettes, but their smoking habits do not extend into adulthood.

Because (1) most smoking-related disease begins after age 50 (see chapter 4) and (2) we have a longitudinal data set containing detailed information on smoking behavior, health, and utilization of personal health services of both spouses for married persons, we focus much of our analysis of the cost of smoking to the over-50 age group. As explained above, most adverse health effects from smoking, including excess mortality, occurs after age 50. Earlier studies of the cost of smoking were conducted before these data became available. By combining our new results with a synthesis of past work, we develop a comprehensive estimate of the total private and social costs of smoking, showing how these costs are distributed among the smoker, the smoker's family, and the rest of society.

Because tobacco products are legal goods, the ultimate decision maker about tobacco consumption is the individual. Informing people about the consequences of their choices is a public role when such choices involve elevated probabilities of adverse consequences to the user. Estimates of the internal costs of smoking are useful also to employers who self-insure, insurance companies, and managed care companies, to determine, for example, the cost-effectiveness of smoking cessation benefits.

The vast majority of information programs indicate only that the activity is harmful to the user. Examples are warnings that the use of alcohol carries health risks to unborn children and various messages that "smoking is bad for you." Our estimates of the private costs of smoking to a 24-year smoker have a shock value and should be useful for antismoking public health campaigns.

One of the most influential prior studies of smoking-attributable cost is by Manning et al. (1989, 1991) with estimates updated by Viscusi (1999). This research was based on short longitudinal databases for a three to five year period, the Rand Health Insurance Experiment (HIE) and a single cross section, the National Health Interview Survey (NHIS). We also use the NHIS, but more importantly, we use a panel data set spanning 1992 to 2000, the Health and Retirement Study (HRS). The HRS not only allows us to follow individuals' consumption and income over time, but to assess the effects of cigarette consumption on utilization of personal health care services over time. Since Social Security records have been merged with data from the HRS, we are able to study the effect of smoking on contributions to and benefits from the Social Security program. The Rand HIE excluded persons over age 62 and ran for 3 to 5 years in six localities. By contrast, HRS data are national and include persons into their 90s.

Past calculations have been too narrow in another sense, namely that they have disregarded the nonpecuniary losses from smoking. Such losses stem from pain and suffering, lack of independence in one's activities of daily living, or both, as a consequence of poor health; also included in such losses is the premature death or disability of relatives and friends.

Much of the previous analysis has disregarded distributional consequences. A practical impediment to raising excise taxes on tobacco products has been the regressiveness of such taxes. The incidence of the burden of smoking and policies aimed at reducing the prevalence of smoking is not at all well documented. Distributional concerns address how the burden of smoking and related policies is borne by various segments of the population, in particular smokers and non-smokers. Such analysis is complicated because smoking affects not only mortality but also many other consumption and saving decisions, including the purchase of insurance (health, life, and disability), contributions to and benefits from pension plans, sick leave, and utilization of personal health services. Past researchers were more limited by lack of sufficiently detailed data than were we.

Better Estimates of Effect of Smoking on Health

Most past studies of smoking's effects on health have been based on small clinical samples or longitudinal data from a particular locality, such as the Bay Area, California, or Framingham, Massachusetts. The HRS tracks survival, numerous dimensions of physical functioning, as

well as morbidity. A very unique feature of the HRS that we exploit is that identical data are collected on both spouses. This includes smoking behavior and many other factors.

Expanding the Tally of the Cost of Smoking

Given our data, we are able to study more impacts in greater depth than has been done in previous research. We are not only able to show that the total cost of smoking is considerable but to quantify the major components of such cost.

Chapter Overview

Chapter 2 has two objectives: (1) to provide a conceptual framework for measuring the private and social cost of smoking; and (2) to describe the databases used in our study. We argue that the appropriate framework is longitudinal and that cross-sectional studies can yield misleading findings, except under a very limited set of conditions. Although our results are not qualitatively different from previous studies that have used a longitudinal approach, our analysis is much more detailed and comprehensive in important respects and based on data not previously available. In our study, we ask what is the present value of loss over the life cycle associated with an individual's being a smoker at age 24. Few people initiate smoking after this date. Persons who permanently quit before reaching the age of 24 do not generally experience harmful effects from smoking (Sloan, Smith, and Taylor 2003). We summarize the major databases used in our analysis, including (a) the 1998 National Health Interview Survey (NHIS), (b) three waves of Asset and Health Dynamics of the Oldest Old (AHEAD, 1993, 1995, 1998, and 2000), and (c) five waves of the Health and Retirement Study (HRS, 1992, 1994, 1996, 1998, and 2000). In related work on mortality, we have used the Cancer Prevention Study 2 to assess the impact of smoking cessation on longevity of older persons (Taylor et al. 2002; Hasselblad et al. 2003). These results are used here for comparative purposes.

Chapter 3 discusses previous studies of the cost of smoking. Studies vary considerably in the scope of impacts evaluated, the data used, and crucially, the underlying methodology. As discussed in length in that chapter, one approach addresses the question, "in a year, how much more is spent because people smoke?" We term this the cross-sectional approach. Others have called this a "prevalence" approach

because it is based on the number of smokers alive in a given year. This methodology is mainly appropriate for informing a policymaker about how much will be spent on smoking-related problems during a fixed time period, such as a year, although such studies have been used inappropriately for more general purposes.

The other approach asks the question, “If we were able to influence a person not to smoke, what would be the savings over the person’s lifetime?” In our terminology, this is the life cycle approach. This is sometimes called the “incidence” or “longitudinal” approach in that it reflects impacts of persons who become smokers at a point in time, such as a year.

We argue in chapter 3 that the longitudinal approach is the conceptually superior method, but this is controversial, especially to parties that stand to benefit from having a large estimate: our approach typically yields answers that imply much lower smoking-attributable loss. Intuitively, it relies on the notion that a dead smoker does not require medical care or income support. To illustrate the tenor of the controversy, we reproduce a quotation from the state of Mississippi in box 1.1. After reading this, we suspect that all readers will agree that the subject is controversial. We will address the merits of the argument in chapter 3.

Box 1.1

Critique of Longitudinal Approach

“A credit to the cigarette industry for any monetary savings in elderly health care, as well as other savings resulting in the premature deaths of smokers, is utterly repugnant to a civilized society and must be rejected on grounds of public policy.... The contention of entitlement to an ‘elderly death’ credit is, on the face, void as against public policy. That policy and basic human decency preclude the defendants from putting forth the perverse and depraved argument that by killing Mississippians prematurely, they provide an economic benefit to the State. No court of equity should countenance, condone, or sanction such base, evil, and corrupt arguments.... The defendants’ argument is indeed ghoulish. They are merchants of death. Seeking a credit for a purported economic benefit for early death is akin to robbing the graves of the Mississippi smokers who died from tobacco-related illnesses. No court of law or equity should entertain such a defense or counterclaim. It is offensive to human decency, an affront to justice, uncharacteristic of civilized society, and unquestionably contrary to public policy.” *Litigation Memorandum*, State of Mississippi. Cited in Viscusi (2002, p. 87).

Chapters 4 through 10 implement the analytic approach described in chapter 2. In chapter 4, we present estimates of smoking-attributable mortality. The life table described in this chapter was used throughout our empirical analysis. In estimating smoking-attributable mortality, it is essential to compare mortality experience of actual smokers with what they would have experienced if they did not smoke. We term the latter “nonsmoking smokers.” Such persons are as close to smokers as our data allow us to make them. The only difference between actual smokers and nonsmoking smokers is that the latter did not smoke at age 24 and did not initiate the habit thereafter. Adjusting for factors that may affect mortality other than smoking but are correlated with smoking is important. These other factors include other health behaviors, such as excess alcohol consumption, educational attainment, risk and time preference (degree of risk tolerance and impatience for present versus future returns, respectively), and demographic characteristics. The difference between survival of smokers and nonsmoking smokers is less than that between smokers and nonsmokers, but considerable nonetheless. Our study’s data permitted a much more comprehensive adjustment for the nonsmoking smoker than was possible heretofore.

A key question of our study involves a comparison of contributions smokers make to various funds, including Social Security, pensions, health insurance, and other insurance relative to the benefits they receive. In chapter 5, we assess the impact of smoking on expenditures on personal health services over the life cycle—between the ages of 24 and 50, 51 and 64, and 65 and over. We find that smoking increases expenditures incurred by persons aged 24–50, but decreases expenditures at later age, largely because smoking reduces the probability of survival. Smoking-attributable cost to such public programs as Medicaid remain considerable, but only at a point in time, not over the life cycle. The impact of smoking on Medicaid expenditures was far less than implied by the compensation states received from the MSA. Effects on contributions to health insurance plans are complex, but overall the effect of smoking is to decrease such contributions.

In chapter 6, which presents results on the influence of smoking on contributions to and payments from Social Security Old Age and Survivors Insurance (OASI) and Social Security Disability Insurance (SSDI), we present new evidence on earnings and individuals’ contributions to Social Security and Medicare trust funds, based on files for the years 1951 to 1991 that have been linked to HRS respondents. We

show how smoking affects lifetime contributions made by workers to these public programs. This analysis marks the first time *actual* contributions to these public programs and actual taxable earnings of smokers and nonsmokers and taxable earnings have been compared. As with Medicare, the effect of smoking is to reduce expenditures on Social Security's net spending (i.e., payments minus contributions). Somewhat surprisingly, we found considerable earnings loss attributable to smoking for men (nearly \$40,000 over the life course), but trivial effects for women. In the context of smoking, since longevity and smoking patterns differ by gender, it is essential to perform separate calculations for men and women.

Chapter 7 presents a parallel analysis for private pensions. In the United States, private pensions may be defined benefit or defined contribution plans. Under defined benefit, the employer guarantees the employee a fixed payment based on a formula including such factors as years of service and earnings. Smokers may lose in such plans by dying earlier than nonsmokers, but smoking also affects lifetime contributions to private pension plans. By contrast, for defined contribution plans, no transfer is made between nonsmokers and smokers because the amount the employee receives after retiring or as a death benefit depends on the amount contributed to the employee's account as well as the return on these contributions. Data from the HRS provide valuable detail on characteristics of individual respondents' pension plans, offering a unique opportunity to study the impact of smoking on, as it turns out, cross subsidies from smokers to nonsmokers.

In chapter 8, we study the influence of smoking on life insurance. If life insurers imposed actuarially fair surcharges (compensating for the amount an insurer expects to pay on behalf of an insured person at the time the premium is paid) to reflect the reduction in life expectancy from smoking, there would be no transfer. However, as seen in this chapter, at least historically, this has not been the case. Thus, in the context of life insurance, smokers benefited at the expense of nonsmokers.

Chapter 9 assesses the influence of smoking on morbidity, disability, and on work loss. That smoking affects morbidity and disability as well as mortality is not surprising. What *is* new, important, and surprising is that smoking has such a small impact on years spent with major disabilities. In prior research, some of us had found that smokers found information about the effects of smoking on disability more

salient than those on survival (Sloan, Smith, and Taylor 2003). Here, we find that although smokers become disabled sooner on their way to a sooner death, they do not spend much more time with a major disabling condition. To the extent that smokers discount the future at moderate rates, having disability sooner rather than later should matter. However, if smokers are very shortsighted, they may not care at 24 if disability is xx years in the future or $xx + y$ years away. We quantify losses from disability in dollar terms, based in part on some previous research one of us conducted on willingness to pay to avoid limitations in activities of daily living among the elderly. Putting a dollar value on death and disability is controversial (see, e.g., box 1.1), but it is done by all private and public parties, implicitly through actions and decisions that people make. Of course, one can argue with the values used, but we provide a transparent method for plugging in alternative assumptions.

In chapter 10 we turn to the effects of smoking on the health of spouses and partners within the same household. Our database, the HRS, is unique in providing identical information on both husband and wife. Thus, not only do we know how much and for how long each has smoked, but we know a lot of each person's characteristics, particularly their health and functional status. With this information, we are able to produce new estimates of the mortality and disability cost a smoking spouse imposes on his or her partner. For smoking men, such cost is about \$30,000. For smoking women, the cost is about half as large. In this study, we provide no new information about the effect of environmental tobacco smoke on children. For this, we rely entirely on the literature review presented in chapter 3.

Chapter 11, our concluding chapter, provides an opportunity for a net assessment. Having assembled the various pieces of the puzzle, we are able to state from a global social perspective whether smokers "pay their own way." The bottom line is that women who smoke at 24 generate a social cost with a present value of \$106,000 (\$86,000 private) in year 2000 dollars. For men, the present value is twice as large, \$220,000 (\$183,000 private). If men who smoke in early adulthood face a future cost of \$183,000 attributable to their smoking habit, we can only wonder why they smoke. We ask but do not answer this fundamental question. Just to respond that people smoke because they are addicted is one answer, but not a very satisfying one. After all, many smokers quit. Finally, we assess how well current policies measure up in light of this net social burden and offer guidance for future research and policy directions.